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safety guide for farming

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MESSAGE FOR FARM SAFETY GUIDE

Farming is a specialized occupation, and, as such, presents special hazards. Complex machinery, dangerous chemicals, and unpredictable livestock are all a part of the farm environment. The best defences against these hazards are constant attention and effective safety skills.

Awareness of potential dangers and the adoption of safe farming practices are what the Alberta Farm Safety Program is all about. The Farm Safety Program has been working with Alberta's agricultural community since 1976, promoting health and safety on the farm.

The "Safety Guide for Farming" is one of the Farm Safety Program's most useful tools. In this guide, farm families will find valuable, reliable information on methods of avoiding accident and injury in handling machinery, livestock, chemicals and other elements of the farming operation.

I am pleased to take this opportunity to salute the achievements of the Alberta Farm Safety Program. Program members have made great progress in the fight to reduce the occurrence of agricultural accidents.

I urge all rural Albertans to join with the Farm Safety Program in creating a safe, healthy environment for those who live and work on Alberta's farms.

Peter Elzinga
Minister of Agriculture

ACKNOWLEDGEMENTS

In completing this guide we are greatly indebted to the many people who helped directly with ideas and suggestions or who made available their time, facilities or material.

Our greatest thanks must go to the farm accident victims in Alberta who, in time of pain, graciously allowed us to collect our accident information. Appreciation must also be extended to the participating hospitals of the Farm Accident Monitoring System for their efforts, the Chief Medical Examiner's office for supplying us with much needed information on farm accident fatalities, Alberta Transportation for highway accidents, and to Alberta Labor for data on electrical accidents. Thanks also go to Alberta Agriculture's systems development division personnel who have aided us in compiling and presenting our data.

A thank you is extended to workshop/seminar participants who have provided us with invaluable suggestions. We hope those who have provided us with comments in the past will find some of their ideas incorporated into this guide.

Finally, we would like to emphasize that the information and recommendations in this safety guide are reliable and reflect expert contemporary opinion on the subject area(s). However, we assume no responsiblities or liability for the accuracy or sufficiency of this information, recognizing that circumstances, conditions and other extraneous but pertinent factors may vary greatly.

Solomon Kyeremanteng

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INTRODUCTION

Accidents do happen.

Accidents are costly.

A sense of safety consciousness is the best defence against farm accidents. The intention of this guide is to provide information and data about farm hazards and how they may be avoided. It is hoped this guide will enable those who work on a farm to increase their own safety consciousness, thereby ensuring a safer environment for everyone.

ACCIDENTS DO HAPPEN

Farming is alleged to be the third most dangerous occupation in North America in terms of death rate. It is second only to construction in the number of deaths it actually causes. Despite a decrease in farm population, surveys show the death rate in farm accidents has increased so much that today the chance of a farm dweller being accidentally killed is greater than that of the city dweller. Hired farm workers are in special danger since their rate of severe accidents is almost twice that for farming family members. The majority of these farm workers are under 30 years of age.

In June, 1976, Alberta Agriculture in co-operation with Alberta Labour (now Alberta Community and Occupational Health), began conducting a farm accident report program at 15 hospitals throughout the province. The number of hospitals was increased to 36 in June 1977. The program provides basic information on the site, nature and causes of farm accidents, for people who require hospitalization and those who don't. Detailed data are presented in Appendix B (page 33).

ACCIDENTS ARE COSTLY

In farming, where one day can mean the difference between loss or profit, spending a few extra minutes on safety can make a great difference. Being safety conscious is a valuable asset when you look at all the costs of an accident. First there are physical costs, the loss of a limb or even life. The pain and trauma of stepping on a nail, being kicked by a horse, breaking a leg or losing an arm are long remembered. A second cost is loss of income. Money is spent in hiring extra help. Money is lost in crops left standing, in equipment damage, and in paying medical expenses or compensation. Money is lost as productive time. These are only immediate costs.

There are also future liabilities. Ask someone who only has one arm how hard it is to dress, let alone do regular farm chores. What would a permanent disability mean in terms of your work or earning power?

Once a person realizes the possibility of getting hurt and what costs are involved, he must ask himself two questions: How do these accidents happen and what can be done to prevent them?

To shed more light on farm safety, let's see what the farm worker really faces on the farm.

- Farm work requires knowledge of many activities with each activity requiring specialized skills. Because of the difference between, and the length of time spent on each activity, farm workers probably won't gain enough experience to realize the hidden hazards in each activity.
- Farm environments present special hazards such as complex machinery, large quantities of gasoline and other flammable liquids in storage, working outdoors under adverse conditions, livestock handling and extensive use of tools. Special skills, and above all, constant attention, are required to cope with specific hazards present in each of these areas.
- Farm workers must often endure long hours and hard labor. These factors can lead to haste and decreased concentration, which may lead to accidents.
- Unlike other occupations, farming generally does not offer supervisors, foremen, unions or compensation boards to look after workers. Farm workers must look after themselves.

Time and time again we've found the biggest single factor in accidents is the human element. Haste, fatigue, stress, illness, intoxication, poor vision, age, inexperience, poor attitudes and ignorance of safety procedures all form part of the human element. We can prevent some accidents, but not all. Safety consciousness means always being on the lookout.

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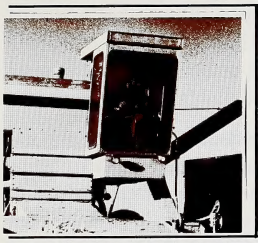
CHAPTER 1



MACHINERY SAFETY

INTRODUCTION

More farming accidents in Alberta involve farm machinery than any other agent. Of all farm machinery, the tractor is most likely to be involved. From 1976 - 1985 there were 110 tractor fatalities out of a total of 275. These unnecessary fatalities point out the need for greater safety consciousness while operating machinery. Statistics supplied by the Chief Medical Examiner's office to the Farm Safety Program on farm deaths involving tractors are presented in the table below.

CAUSES OF ALBERTA TRACTOR-RELATED DEATHS 1976 - 1985

CAUSES OF DEATH	NO. OF VICTIMS
Tractor rollover	74
Run over by tractor	30
Crushed between tractor and truck	1
Crushed between two tractors	1
Crushed between tractor and leg	1
Crushed between tractor and bailer	1
Crushed by 3 point hitch on tractor	1
Crushed by tractor falling off jacks	1
Total	110

Although the tractor is the largest single factor in farm machinery accidents, as a group, harvesting equipment such as combines, swathers and balers are involved in more accidents. Therefore, most of chapter 1 will be devoted to harvesting equipment.

The first part of this chapter will deal with why farm machinery accidents occur, the second will deal with the hazards common to all farm machinery, the third, with specific requirements for safe tractor operation.

The operator's manual for any machine is one of the most useful resources for learning safety procedures. A full set of operator instructions and safety rules is usually provided with every farm machine purchased. If these aren't available, we highly recommend you contact the dealer who sells the particular machine. He will be able to provide the information necessary to familiarize you with the machine you will be operating. If you are an employee ask the farmer about any dangers peculiar to his machines and any safety precautions you should heed. It is important to know the strange habits of each machine so you can maintain the machine properly and operate it safely.

BAD LUCK OR CARELESSNESS?

Many accidents have been attributed to bad luck. In an analysis of bad luck situations, it is usually not very difficult to locate some type of human error. Human errors may often be identified as carelessness.

A careful machinery operator locates hazards before the hazards affect the operation of a machine (or his safety). In this way he can effectively eliminate bad luck.

COST OF MACHINERY ACCIDENTS

Loss of a day's work during the crop growing season has been estimated to cost from $600 to $800 per day. Accidents can cost an average of 19 days of working time.

Often, when an accident occurs, several farmers may be forced to adjust their schedules. Even if personal injury has not occurred, many hours are lost as a result of the accident.

Accidents are extremely expensive. They may cost in hospital bills, doctor bills, extra hired labor, machinery repair, tractor and machinery rental, or pain and suffering and loss of the use of limbs for the rest of one's life.

Farm machinery is being made safer by manufacturers, but the safe use of farm machinery will continue to be the responsibility of workers who are interested in reducing the many costs of accidents.

CAUSES OF FARM MACHINERY ACCIDENTS

"A safe day in the field is more than just guiding the tractor along a furrow. It begins when the equipment is checked out and properly serviced, and the seat mounted by an operator capable of good work who avoids hazards and errors that lead to mishaps.
—National Safety Council

ATTITUDE

Accidents often occur because of a poor attitude towards safety. A farmer with a good safety attitude prepares his machine for work and operates the machine correctly. He is responsible for his own safety and that of others, and is alert to hazards in his

environment. Common attitudes or beliefs which are related to unsafe working conditions are:

- It can't happen to me.
- The law of averages will decide the outcome.
- When my number is up, it's my turn.
- I'll just take one more chance.

When accidents occur, some people rationalize that the accident was a price of progress or "was to be". A positive safety attitude cannot eliminate all accidents but it can result in a safer person and therefore, a safer working environment.

CHILDREN NEAR OPERATING MACHINES

Keep children away from and off operating tractors and implements. Many adults have thought they were doing small children a favor by allowing them to ride on tractors and implements on the farm and on the highway. In many farm communities there are local people who can describe or recall a serious injury, or the death of a small child due to a fall or other type of accident involving either moving or operating farm equipment. In Europe, where farm tractors are often used for family transportation, a rider's seat is provided. North American engineers have never felt it advisable to provide a rider's seat because space is limited in the operator's position on most tractors.

Children are naturally curious and fascinated by moving equipment. They often approach a machine in a position where they cannot be seen. It's important that children be taught to stay in view of the tractor or machine operator at all times. At least three children are run over by farm machinery every year in Alberta.

Agriculture is unique in that most of the farm work is performed at home. It is also unique because the children in the family have an opportunity to assist with many hazardous farm operations where livestock and machinery are involved. Until children are physically and mentally mature enough to be trained to operate machinery, they should not be allowed on or near equipment while it is in operation.

CLOTHING

A great deal of emphasis has been placed on the hazards of loose clothing. Clothing that is suitable for street and sportswear may be unsuitable for tractor and machine operators. Jackets unfastened, shirts untucked or flared trousers are examples of loose clothing which may be caught in moving machine parts. Many operator's manuals suggest that women should wear slacks instead of skirts when working with machinery. Head scarves should never be worn around operating machinery. Strangulation has occurred when scarves became entangled in rotating parts. Only properly fitted work clothing should be worn while operating farm equipment.

COMMUNICATION

The spoken word is the natural way to communicate with fellow workers. Unfortunately, voice communication is often misunderstood.

Many accidents involving farm machinery have occurred because the communication between two workmen broke down or because voice communications were not understood.

Hand signals can be used around farm machinery when noise or distance does not allow for normal voice communication. It is very important that all operators and other workmen be familiar with the meaning of hand signals. Use of hand signals is becoming increasingly important as more farmers buy sound-reducing cabs with tractors and SP (self-propelled) implements.

FATIGUE

Unfortunately, many farm operations require a considerable amount of time, and farmers often work until a job is done. Because reaction time increases with increased fatigue, the risk of personal injury also increases. Machinery operators should consider their own level of fatigue and that of their helpers. In addition to getting an adequate amount of rest, they can alternate jobs during the day. Farmers need to take a break from jobs which require alertness and constant response to changing conditions.

HOUSEKEEPING

You can relate the appearance of farmsteads and machinery to the level of management (and safe working conditions) maintained by a farmer in his environment. Accumulation of debris around farmsteads and in fields can cause machinery damage, resulting in personal injury. The build up of mud, discarded bolts, machine parts or tools on tractor or machinery platforms and steps have resulted in serious falls. Farmsteads should be given a good housecleaning each year. Accumulation of debris should be removed so that the farmstead, buildings and fields become safer places to work.

HURRY

The more aggressive (and possibly the more successful) farmers are more accident prone than less aggressive farm operators. Farmers are under pressure to get as much done as possible in the time

available. Many farm accidents are related to rushing one job in order to go on to the next. In the long run, this has resulted in lost hours of labor, loss of money, and pain or suffering. By not rushing through jobs, a farmer will have more time to think and plan ahead which will reduce accidents.

Operate in a deliberate manner. This allows you to react to a changing environment. The importance of planning ahead can be illustrated by the actions of the pilot of a jumbo jetliner with 300 passengers aboard as he prepares to land the aircraft. One hundred miles from the airport, he calls ahead for a report on weather and runway conditions. Travelling at 10 miles a minute with only 10 minutes to go, he and the co-pilot recheck the airport approach map and plan every manoeuvre until touch down. Nothing is left for a last-second decision.

IMPROPER MAINTENANCE OF MACHINERY

Regular maintenance, observation of unsafe machinery parts, and correction of machinery hazards are also important. There are many examples of machine failure which could cause human injury or loss of working time. For example, loose or broken machinery parts, loose wheels, cracked hydraulic line fittings or unsecured mounting pins have all caused serious personal injuries. Even with careful inspection of machinery, machine failure can occur. However, it is less likely to happen if the operator checks the conditions of the machine seasonally and before each day's work.

IMPROPER USE OF MACHINERY

In the quotation from the National Safety Council at the beginning of this unit, a safe day is described as beginning with a machine in good repair and having an operator on the seat of the machine who is capable of good work and who avoids hazards and errors that lead to mishaps. In other words, common sense and good judgement by the machine operator are very important at all times. Farm machinery operators should not try to exceed the capability of their machinery.

Many accidents are related to machine stability. Others have to do with load lifting or carrying capacity and with machine failure related to improper use. Farm machinery is designed by experts and built for a specific purpose. When human error forces a machine beyond its designed capability limits, the machine operator is in a hazardous position and the machine is not functioning efficiently.

IMPROPER USE OF TOOLS IN MACHINERY REPAIR

In the repair of farm machinery, many accidents involve the misuse of hand and power tools and the use of improper and unsafe tools.

A farmer may purchase a new $40,000 tractor and he immediately transfers his tools into the new tractor's tool box. A close examination of the tools reveals a hammer with a loose head, two adjustable open-end wrenches with loose jaws, a pair of pliers that slips between adjustments, a set of combination wrenches that are greasy and an old wrench more aptly described as a "malleable knuckle buster". In the bottom of the old tool box, you find dirt mixed with several old and new grease fittings, nails, orphan nuts and bolts, an old rusty pocket knife, several punches and chisels with mushroomed heads. The tractor may also carry a log chain which has been spliced with a bolt. In this case, the farmer could logically invest some time and money in repair, selection and purchase of new tools.

Poor quality tools may lead to accidents. Mushroomed heads on punches or chisels continue to mushroom and often result in metal chips which break off and endanger the user or others in the immediate area. Mushroomed heads of tools should be ground to a chamfer to make them safer.

Wrenches should be kept clean and used only if they fit correctly. Wipe greasy tools clean with a hand rag after using them. Wrenches should be pulled toward and not pushed away from the body for tightening or loosening bolts or nuts. Adjustable open-end wrenches with loose jaws will often slip. Broken or worn tools should be repaired or discarded. Log chain links should be repaired by welding.

Injury can result from electrical shock caused from using improperly insulated electric hand tools such as drills, grinders, and impact wrenches. Extension cords should be in good condition and three-pronged. Avoid the use of frayed extension cords with poor male and female connectors.

Another misuse of tools consists of improper repair of machinery by welding. Farmers should not risk weld failure.

Because modern machinery is constructed with medium and high carbon steels, some special treatment of metal is desirable. For example, low hydrogen electrodes should be used in welding these types of steels. Medium carbon steels should be preheated before welding. Farm welders should know the limit of their capabilities and seek competent help for any special welds. These special welds include machinery hitches and parts which raise or lower machinery that is transported on roads.

Many farmers do not understand the implications of welding or cutting galvanized metal. Galvanized

metal, when heated, gives off an extremely toxic zinc oxide gas. Accumulations of zinc oxide in the body can result in serious illness or death. As machinery used on farms becomes more complicated, farmers should depend on qualified servicemen to complete repair jobs if there is any question about efficiency of machine operation or risk of personal injury.

Other sources of injuries related to machinery repair are found in the use of gas welders. Oxygen and acetylene gases are extremely explosive when mixed. The gas welder should be used in such a way that gas cannot accumulate and cause an explosion. Line connections should be checked with liquid soap to eliminate leaks. Cylinders should always be secured in an upright position when transported. If cylinder valves break, oxygen cylinders may fly through the air because of the force of the gas pressure.

LACK OR MISUSE OF SAFETY DEVICES

The use of machinery shields and guards to protect the operator at "pinch points" and from rotating machine elements is increasing. Some machines are fitted with guards or shields that cannot be removed when the machine is operating. Many older machines have not been adequately guarded, but machinery manufacturers are trying to make their new machines as safe as possible.

The operator also determines how safe a machine will be. If fire extinguishers, guards, shields, or other safety devices are removed and not replaced, or if the machine is operated carelessly, the operator has set the stage for an accident. Safety devices should always be kept in place on operating machines.

LACK OF TRAINING

The statement that "experience is the best teacher" is often true. However, machines often do not allow a second-chance experience. No one should be allowed to operate a machine without first being instructed in operating procedures and possible hazards. Many accidents occur because the operator did not respond correctly at a critical time. A beginning operator should not be placed in a position where hurried responses may cause personal injury to himself or others.

WEATHER

Accidents often occur during inclement weather. Farmers cannot control the weather, but they can consider hazards associated with mud, ice, snow or frozen ground. Machinery response to steering changes with differing weather and soil surface conditions. Jacks used in changing tires or wheels are always less stable in mud or snow. It is always more difficult to complete machine repair and adjustments in extremely cold or warm conditions.

HEALTH

Health is an important factor in farming accidents. Pain, weakness, discomfort and loss of co-ordination reduce your performance. Many farmers know about conditions that may reduce their effectiveness and take precautions to avoid accidents. Others do not try to adjust their activities to conditions that could impair their ability to safely operate machinery.

According to Jack W. Burke, editor of the National Safety Council's *Farm Safety Review*, there are several health problems which could cause accidents. The following list includes health problems which may (or often should) restrict farm machinery operation: heart disease, blood pressure, strokes, diabetes, cancer, arthritis, epilepsy, poor vision, poor hearing, improper diet, obesity, pain or discomfort, infection, smoking and alcoholism.

The overall effect of health problems is reduced physical capability. A machine will probably be safer if the operator is in good health. However, good health will not guarantee an accident-free day's work.

Farm workers should have regular medical check-ups. If health problems are found, adjustments can be made for the physical capabilities of each person. In case of fever, dizziness, pain, infection or other conditions which may affect one's ability to operate a tractor or machinery, safety first should be the rule.

SUMMARY OF WHY ACCIDENTS OCCUR

Two hundred and seventy-five farm accidental deaths were reported in Alberta between 1976 and 1985. Some factors that cause farm machinery accidents include:

- attitude
- children near operating machinery
- clothing
- fatigue
- lack of tidiness
- hurrying
- improper machinery maintenance
- improper use of machinery
- improper use of tools in machinery repair
- lack of safety devices
- lack of training
- poor communication
- weather
- health

Bad luck may just be carelessness. Accidents cost, in pain and suffering, in hospital and doctor bills, in

hired machines and hired help, many dollars in machine repairs and a tremendous amount of money in loss of machinery operation time.

FARM MACHINE MAINTENANCE

Most modern farm implements are furnished with adequate safety devices. Yet, it is still important that the operator recognizes the danger involved in using equipment improperly and understands the need for taking precautions.

On modern farms different machines vary greatly in operation. A discussion covering each one is beyond the scope of this guide. However, there is a need to cover as many hazards as possible. Therefore, in this section we will discuss hazards common to all machinery. Then, with the knowledge of the different types of hazards which do exist, the farmer can easily adapt these safety procedures to any piece of equipment.

CHAINS, SPROCKETS, V-BELTS AND PULLEYS

One of the most common machinery accidents involves chains, v-belts, and pulleys. Injuries usually occur when parts of the body are drawn into these rapidly moving parts. These parts rotate so fast a person does not have time to escape. By the time the person realizes he will be caught, it's too late.

Rotating parts are found on almost all powered equipment including combines, swathers and balers. Exposed rotating parts such as chains, belts or pulleys are usually protected by shields. Following some basic rules can prevent injury.

- When a machine is operating, shields should be in place. If the shields are removed for repair or maintenance, the machine shouldn't be operated.
- If rotating parts must be exposed for proper equipment operation, then awareness is the best safety protection. Always check equipment before operation to locate these potential hazard areas.
- If any part must be adjusted, repaired or unclogged, make sure the machine is shut off and the parts have stopped moving before removing the shield or sticking your hand near any parts. Even if the jam is located outside, moving parts could still draw you in.

GEARS, ROLLERS

These parts pose the same hazards as chains, belts and pulleys, except they involve two or more fixed parts turning into each other. Rollers are especially dangerous since they must often be exposed during normal operation. Never attempt to pull out anything going into rollers or try to get it through by pushing. The material moves so quickly that normal reactions aren't fast enough to prevent hands, feet or clothing from being drawn in.

POWER-TAKE-OFF, EXPOSED SHAFTS

The power-take-off (PTO) is perhaps the most infamous machinery hazard. Although most modern machinery has fully shielded power shafts, many accidents still occur each year, usually when clothing

becomes caught on an unguarded rotating shaft. Safety involves following these rules:

- It is vital to use shields when operating equipment powered by a PTO. The few extra seconds needed to position shields properly is worthwhile.
- Always disengage the PTO and shut off the tractor engine before leaving the seat.
- Never step across a rotating shaft even if shields are in place since they can malfunction. If a shaft is unguarded, its speed and power will cause anything which comes in contact to catch and begin to wrap around. Even smooth shafts can catch clothing or hair. PTO speed is so great it leaves no time for reaction. Its power is so great it will pull off an arm or leg in seconds.

JACKS, HITCHES AND LIFTS

Many accidents involve crushing of arms, legs or the whole body. They happen when someone is caught between two objects, like a draw bar and a hitch, a tractor and an implement, or a hitch and the ground. The following preventive measures should be taken.

- It is important to be aware of what may cause a crushing injury and how to avoid those situations.
- Be especially careful when standing between a tractor and an implement.
- If you aren't driving, be sure the operator knows where you are.
- When hitching an implement to a tractor, the operator should attempt to line up the hitch holes from the tractor seat, then shut off the engine before dismounting to attach the hitch.
- Never place yourself under anything supported only by a hydraulic lift. Always use blocks as a safety precaution.

BLADES, CUTTER BARS

Blades can be dangerous components of farm machinery, simply because they can't be fully guarded if they are to perform their function. However, they can only cause injury if someone comes in contact with them.

- Know how the blades operate and where they are located.
- Make sure all guards are in place.
- If you must make repairs, make sure the engine is shut off and all power disengaged. Even when the power is off, make sure the blade has stopped before reaching near it.

AUGERS

Augers can be separate implements or an integral part of other machines. In either case, an accident involving a part of the body being drawn into the auger is particularly disabling.

- Most new augers have shields. If shields must be removed for repair or maintenance, replace them immediately.
- When working near augers where no shields are provided, keep hair, loose clothing, hands and feet away from the auger.
- Keep the area free of objects which may cause slips or falls, and never use hands or feet to push material into the auger.
- Before attempting to unclog an auger, shut off the engine and disengage the power.

PROJECTILES FLYING OFF MACHINES

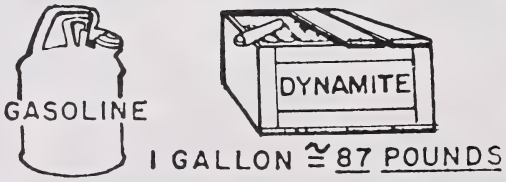
Machines that cut, chop or grind can throw material or other objects at the operator or nearby observers. To prevent this type of accident, know which machines present this hazard, such as rotary mowers, brush cutters, shredders and straw choppers on a combine or feed mill. Make sure all shields are properly placed. Even when shields are in place, objects may still be thrown out, so be careful when approaching these machines and always stand clear of places where objects may be flung out.

TRACTOR MAINTENANCE AND SAFETY

A great proportion of machinery accidents occur during either maintenance or repairs. Therefore, it's necessary to discuss basic safety procedures to be followed during daily maintenance.

REFUELLING

- Shut off engine and give it time to cool down.
- Avoid smoking or lighting a match near a refuelling operation. Gas fumes are heavier than air and will drift downward from the container. It is the vapor not the liquid that burns.
- Take care not to spill any gasoline on a tractor. If you do, wipe it up.
- Small amounts of fuel should be stored in approved safety cans for your protection.



1 gallon of gasoline has the same explosive force as 87 pounds of dynamite.

CHECKING WATER AND BATTERY

An engine's cooling system is pressurized at operating temperature. If this pressure is released quickly, the liquid will turn to steam and blow out of the cooling system forcefully.

- When the engine is hot, remove the radiator cap very slowly. Protect your hand by putting a rag over the radiator cap. (When possible, let the engine cool before you check the coolant level).
- To avoid the battery from "spitting" acid, always shut off the engine before checking the water level in the battery. Acid can cause skin burns and blindness. Rinse the affected area thoroughly with water and if necessary obtain medical aid.

STARTING THE TRACTOR

When a combustion engine runs it produces deadly carbon monoxide (CO) gas. Carbon monoxide is colorless and odorless, so its presence can't be detected by our senses. Breathing CO in concentration, for example in a closed garage, can cause dizziness, headache, drowsiness, then unconsciousness and death. Never start a tractor engine in a garage with the doors shut. Always provide adequate ventilation for a running tractor engine.

Before starting a tractor the operator should:

- Check to see no one is leaning on or standing near the tractor.
- Put the tractor into park. If the transmission is manual, put the gearshift into neutral, apply the brakes and disengage the clutch.
- Check to see all safety shields are in place. If the PTO (power-take-off) is not being used, the cone should be put over the splined shaft. If cone covers are not provided with the tractor, they are easy to make. Some shafts are a severe safety hazard because they turn when the engine is running even though they are not in gear. These splined shafts can easily catch clothing and pull you down to the shaft.

FIELD OPERATION

Gordon was using a tractor to pack silage in a pit. To weight the tractor, two 45-gallon drums filled with concrete were fastened to the machine, one at the front and one at the back. After he had finished at the silage pit, he started home with the tractor. As he was driving up a steep hill to the yard, the tractor accidentally shifted into neutral. It rolled back down the hill, across a small plateau and into a strong corral fence. Gordon was pinned against the fence by the steering wheel for quite a while before he was found. He died later that day of hemorrhage, due to a lacerated liver.

More accidents occur while farm machines are being operated than any other activity. Of the 110 tractor-related deaths reported between 1976-1985, 74 involved rollovers. The remainder of this section deals with the safe operation of tractors and will discuss how to prevent rollovers and other types of accidents.

There are two major factors involved in tractor rollovers:

- The extreme power of a tractor, which can cause the body of the tractor to rotate about the rear axle when the large rear tires won't turn.
- The tractor's high centre of gravity combined with its heavy weight makes the machine unstable when crossing steep slopes or turning sharply at high speeds.

To avoid rollovers or back somersaults, follow these rules:

- Hitch loads to the draw bar only, and keep the draw bar as low as possible. A draw bar higher than 0.5 metre greatly increases the chance of a backward tip.
- Never overload a draw bar, and take up any slack in a hitch slowly. These precautions reduce the chance of a flip and the tendency for parts of a snapped chain or cable to fly at the driver.
- When pulling loads uphill, go slowly and avoid quick acceleration. Whenever possible add front-end weights.
- When operating on steep slopes, drive down the slope forward, and if possible, proceed up the slope backward. If rolling backward down a slope, using brakes or engaging a disengaged clutch may cause the tractor to flip.
- If the tractor is stuck, always attempt to drive out backwards.

Murray and Doug were trying to remove a potato harvester that was stuck in a field. Doug pulled with his tractor while Murray pushed from behind with his. As Doug was attempting to pull, his tractor rotated about the rear axle until it overturned on top of him. Doug died several minutes later from aspiration of gastric contents (choked on stomach fluid). Harvesting stopped until a new man was hired several days later.

To prevent slide rollovers, keep these practices in mind:

- Adjust speed according to operating conditions. Watch for bumps or depressions. Don't let a tractor bounce which can cause loss of steering control. Avoid fast braking while pulling loads at high speeds. It will cause the implement to jack-knife.
- Be extra cautious when crossing slopes. Keep equipment on the uphill side. Don't make fast turns, especially uphill. If in doubt, always make downhill turns.

- When working near ditches and banks, keep any machinery as far from the edge as the bank is deep. This will reduce the chance of cave in.

FRONT-END LOADER WORK

Operating a tractor equipped with a front-end loader calls for extra precautions. The operator is in much greater danger while operating a front-end loader than he is while doing ordinary field work. Observe the following safety rules very carefully.

- While loading the bucket, drive the tractor in a straight line. Never try to load while turning. If you were to hit a solid object, the tractor could easily overturn. Load with the bucket on the ground. If the bucket is being loaded high in the air, an uneven load could tip the machine.
- When travelling from the loading site to the dump site, no matter how short the distance, always keep the bucket close to the ground. A good rule to follow when travelling is to have the bucket no higher than the axles of the front tires.
- Turning with a loaded bucket raised above the tractor is a dangerous practice. A quick turn can easily cause an upset. When raising the bucket to unload, keep the tractor travelling in a straight line. Go as close as you can to the dumping point before raising the bucket.

Steve was angry because one of his steers had died. He had just lost all the money he had invested, and now he would have to take off precious time to bury the animal. He got the front-end loader and put the steer in the bucket. He left the pasture using a short-cut where he had to go up a steep hill and make a sharp turn to the right. Suddenly the tractor slid, then overturned. Steve was pinned under his tractor. Before he was found, he died of asphyxia (suffocation) and multiple injuries.

When operating a front-end loader, be sure everyone is well back from the tractor. If you find the load is too heavy for the tractor, take less, or add weight to the back of the tractor. You may also need to add air to the tires.

Jim hitched a ride in the cab as Brent drove the tractor back to the house after hauling bales all day. Jim was standing in the cab with his back to the door. As the tractor entered the yard, the front right tire hit a hole and Jim lost his balance. When the tractor stopped, Jim's clothing caught on the door handle, and he fell out. He died instantly, after the dual rear wheels ran over his head. Unfortunately for Jim's wife and children, he had no compensation.

Never allow anyone to ride on the tractor, and never allow anyone to ride in the bucket where you can't see the rider.

ROUND BALER SAFETY

With the introduction of the big round baler came a new set of hazards. Most baler accidents occur in a similar way. The operator attempts to unplug, adjust or hand-feed the machine while the power-take-off is engaged and the machine is running. He is caught and pulled into the machine. Amputation of arms or legs, or even death may result.

Farmers participating in safety workshops all agree on one main rule. Never dismount your tractor while the PTO is engaged. If you have to unplug or adjust the machine, disengage the PTO and as a second precaution, turn off the tractor.

Accidents occur while handling big round bales because of their tremendous size and weight. They are caused by:

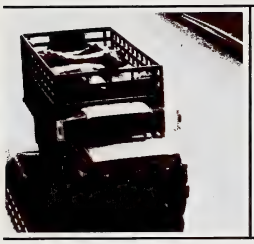
- Ejecting a bale on a hill. Round bales will roll and can cause a lot of damage to machinery, buildings, fences, or people.
- Raising a front-end loader too high. The bale can roll from the loader and onto the tractor, crushing the operator. Always use a bale-restraining device and a tractor large enough to handle the great weights involved. Use a tractor with a rollover protective structure and keep the front-end loader low.
- Overturning the tractor. Keep the loader below axle level, especially when turning. Drive slowly and avoid sudden movements.
- Pulling a multiple bale carrier with a small tractor. Big round bales are heavy. Your tractor should be large enough and weigh more than the combined weight of the bales.

Keep alert and keep thinking. You are responsible for the safety of you and your family. Your farm machinery is only as safe as you decide to make it.

CONCLUSION

Farm machinery presents many hazards. However, accidents need never happen. It takes more than a machine hazard to cause an accident; it takes ignorance of these hazards and of the safety procedures necessary to prevent accidents. Therefore, recognizing common hazards, combined with knowing how to act safely in their presence, is necessary to prevent serious accidents and deaths caused by these hazards. By recognizing common hazards and knowing the safety procedures for avoiding them, the farm worker can easily adapt his safe working habits to most machines. Even more important, one must realize that the best safety device is a good attitude and common sense because we can adapt these to any situation.

CHAPTER 2



HIGHWAY SAFETY

The size of farms and farm machinery and the high density of traffic have resulted in increasing numbers of accidents involving farm equipment. Movement of farm equipment has become a problem for farmers and other vehicle operators who share the roads.

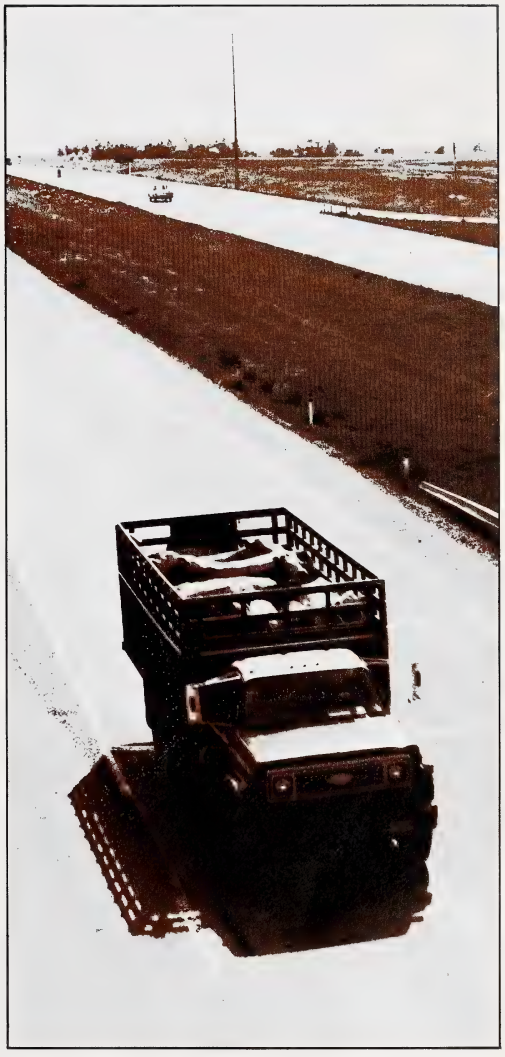
From 1981 to 1985 accidents involving farm equipment were responsible for a yearly average of 24 injuries, three deaths and over half a million dollars damage to property. Many of these accidents involved drivers with little experience, although all ages of drivers were involved.

Eighty-one per cent of these accidents involved collisions mainly with motor vehicles. The most frequent accidents occurred when farm equipment, usually towed, struck or was struck by an oncoming motor vehicle. Other accidents involved farm equipment colliding with parked vehicles or other objects at the side of the road or street. Several accidents occurred when farm machinery was turning left across traffic while a motor vehicle was attempting to pass.

Most accidents occurred while farming activity was at its peak, May to October, when a farmer can least afford lost time due to damaged equipment or injury.

Why did these accidents happen? Factors which contributed to farm implement accidents on the highways were:

- Misjudging the size of farm implements. Wide implements may overlap into another lane and create a hazardous situation.
- Failure to signal intentions clearly.
- Motorists misjudging the size and speed of farm implements and not slowing down when they approach farm implements.
- Inadequate lighting and markings on farm implements to warn motorists of slow speeds and overall width.
- Operator's inexperience in handling large scale tractors and other farm implements on the highway.
- Road conditions such as wet road, bumps, pot holes, snow and ice, soft shoulders and roadside obstacles.
- Unsecured loads; a falling load can create a hazardous situation for other vehicles.
- Swinging out to turn into a narrow driveway and crossing the centre line to do it.
- Hurrying and fatigue on the job.
- Loose parts, poor tires, excessive speed, uneven braking on separate wheels.



Many of the accidents could have been avoided if safety rules were followed:

- Be aware of the size and speed of your equipment. Define limits of equipment with flags during the day, and lights at night.
- Try to travel in daylight at times when traffic is lightest. If you must travel at night, remember rules are the same for farm equipment as for other vehicles. Headlights, taillights, reflectors and clearance lights must be appropriately located and operational.
- Before entering the road, be sure that a slow moving vehicle sign is in place, stop lamps are operational, the rear view mirror is adjusted to provide clear

vision and wheel brakes are locked together to prevent one wheel being jammed by the brake.

- The brakes should be checked to ensure they are set evenly. Consult the operator's manual to find the proper way to adjust brakes.
- Check the steering mechanism for extra play, loose bolts and nuts, and badly worn parts.
- The tire pressure should be even. Be careful with tires that contain fluid or ballast; it is more difficult to check their pressure. Consult the operator's manual for the proper method of checking tire pressure.
- Before entering a road, crossing a road, or turning across a lane to leave the road, be sure you have sufficient room to make the move safely.
- Choose your route with care. If possible, avoid routes with limited sight distances or extremely narrow roads, particularly if you have over-width equipment. If you must travel these routes, the use of an escort vehicle should be considered.
- When entering or exiting from the road, signal your intentions clearly to avoid confusion and allow other vehicles adequate reaction time.
- If a tractor is towing one or more pieces of machinery on a highway, use the throttle rather than the brakes to slow down to avoid jack-knifing equipment.
- Consider ease of transportation when selecting a new implement.

Most accidents involving farm equipment on the highways can be prevented if common sense rules and consideration for other vehicles are observed. Farm equipment and motor vehicles can share the road in safety.

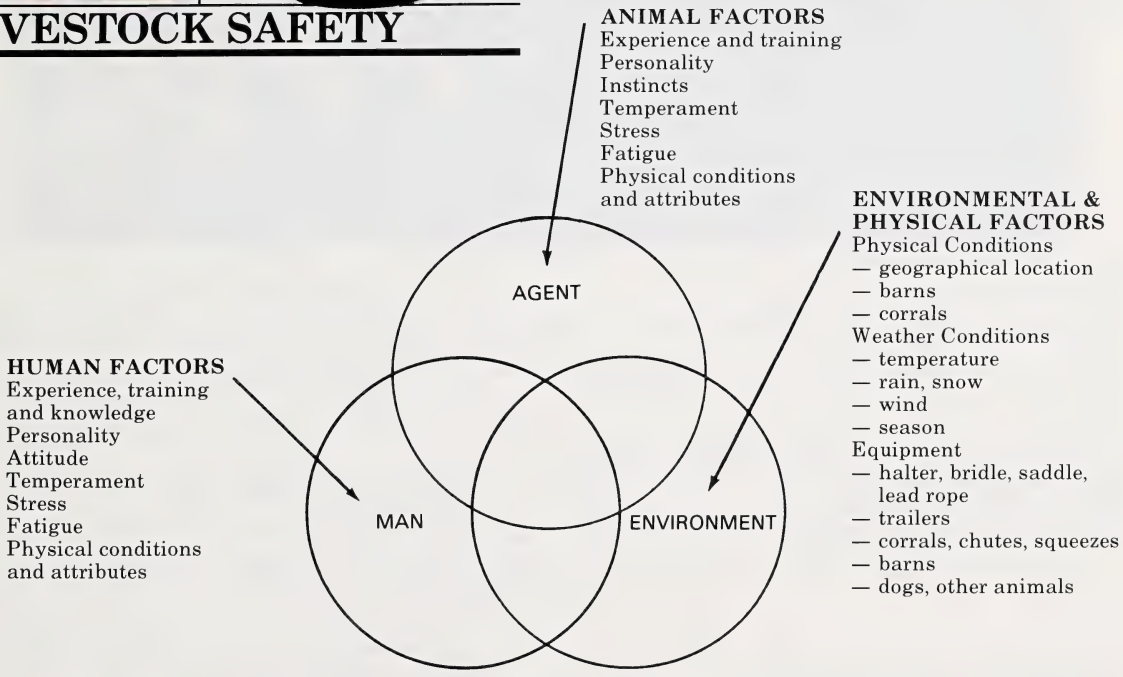
* For more details, see *Traffic Laws for Farm Vehicles and Implements* (Agdex 088-1).

CHAPTER 3

LIVESTOCK SAFETY

INTRODUCTION

No animal comes with a manual for proper care and handling. Since they are living, feeling, reacting creatures, each animal has a unique, spontaneous and learned response to pain and pleasure. There is no switch to turn them on and off when they become dangerous. The chart presented shows the complex components of the animal, the environment and the human sides of an interaction.



FACTORS INVOLVED IN MAN — ANIMAL — ENVIRONMENTAL INTERACTIONS

The halter on Sharon's eight-month-old colt had broken and she was going out to remove it. The day was cold and windy so she donned her skidoo suit before heading into the field. The colt hadn't been handled very much. In fact, it had just been broken to halter. When Sharon got hold of the horse, he shied away from the wind and the rustling of her suit. She tried to hold on, but she slipped and fell underneath him. The frightened colt kicked out, striking her twice in the face. Sharon had to undergo major surgery to have her face reconstructed.

Farm accidents involving livestock cause many injuries and deaths each year. Livestock is second only to machinery as a major cause of reported farm accidents in Alberta.

To deal effectively with any animal, the handler must have some knowledge of the animal's general characteristics such as mentality, instincts and physical attributes. The handler must also take into account the animal's individuality and possible unique deviant behavior. The only way to gain this knowledge is through experience or from the farmer who owns the animals. He should be able to inform you about the temperament of particular animals towards strangers. These sources, combined with this chapter, should give you a good start toward understanding the safe handling of animals.

HANDLING FARM ANIMALS

Cattle

- Avoid rough handling.
- Avoid loud shouts or whistles that could startle an animal.
- Don't get too close to highly strung or newly freshened cows.
- Be gentle with cattle that have sore udders.

- Check cattle for symptoms of disease.
- Never become caught in a "bunching group of cattle".
- Avoid being in a closed stall or open pen with cattle.
- Keep pens clean to prevent slipping and being trampled.
- Use only facilities appropriate for the job you are doing, not substitutes.
- Never reach into a pen through holes in the fencing.
- Never tease a calf, the mother may charge.

Bulls

- Handle bulls in well-constructed bull pens.
- Never enter the bull pen. You should be able to untie the ropes from the outside.
- If you must lead a bull, use a rope through the bull's nose ring.
- When handling a bull, try to keep all other cattle away from his sight and smell.
- Always respect this animal; never tease him. Keep out of his way.

Swine

- Don't enter a pen when a sow has just had piglets; she will attack.
- Boars have razor-sharp tusks; stay out of their pens.
- Keep all pens clean.
- Make sure pens, ramps and gates are in good repair.
- Don't chase piglets unnecessarily; the sow may start chasing you.

Horses

- Let a horse know you are approaching by talking or whistling softly.
- Match your handling skill to the temperament and size of the horse.
- A horse responds to kind but firm treatment.
- Be familiar with the control techniques used in handling horses.
- Learn how to put on and adjust equipment before riding.
- Wear shoes or boots that can slip from the stirrup easily.
- Never ride bare-legged.
- Learn the proper mounting and dismounting techniques.
- When riding a horse:
  - — ride on the right side of the trail
  - — leave some space between the horses
  - — walk the horse when going up or down steep slopes
  - — watch out for branches and barbed wire fences
  - — be extremely careful that a loud noise doesn't frighten the horse and make it run into traffic.

Rams

- Don't enter their stalls or pens.
- Don't tease or provoke them.

Dogs

- Don't tease, excite or provoke a dog.
- Find out from the dog's master if the dog is vicious or not.
- Don't trust any dog you don't know.

FARM ANIMAL DISEASES

In the following chart **preventive measures** is the most important section. It's far better to prevent a disease than to learn about it by getting it.

DISEASE	SOURCE	SYMPTOMS	PREVENTIVE MEASURES
VIRUS DISEASES			
RABIES (Hydrophobia)	Rabid domestic or wild animals (esp. skunk, fox, bat and raccoon)	Headache, nausea, fever, later convulsions or paralysis followed by death	Avoid animal bites, vaccinate pets and farm animals. See a doctor for immunization if bitten.
ORF (Ecthyma)	Sheep, particularly lambs with "blacklip" disease	Postules at site of entry, usually fingers	Avoid contact with affected areas on animal; gloves.
MILKER'S NODULES	Cattle-usually enters through break in skin of hands	Single or multiple nodules on hands, face or neck	Proper management of mastitis in cows; gloves; washing with soap and water after milking.
NEWCASTLE DISEASE	Poultry (esp. baby chicks) with influenza-type disease	Pinkeye, swelling of lids	Proper care and handling of infected birds.
RICKETTSIAL DISEASES			
Q FEVER	Cattle, sheep, goats, wild animals, (esp. birth fluids and tissues)	Headache, fever, cough	Control of infected animals; vaccination of persons at high risk.
ORNITHOSIS (Psittacosis)	Pigeons, parrots, domestic fowl	Headache, fever, cough	Control of infected birds.
BACTERIAL DISEASES			
TETANUS	Any penetrating or crush wound	Painful spasms of jaw and neck muscles, usually fatal without treatment	Immunization every 5 - 10 years; antitoxin injection after injury if no prior immunization.
ANTHRAX (WOOLSORTER'S DISEASE)	Hair or wool of sheep, goats, cattle, horses	Black crust at entry site followed by blood poisoning or pneumonia	Immunization of persons and animals at high risk; burning or burying of affected animals.
BRUCELLOSIS (UNDULANT FEVER, MALTA FEVER, BANG'S DISEASE)	Swine, cattle	Fever, sweats, headache, weakness aches and pains	Proper attention to cuts and scratches; gloves; control of infected animals.
LEPTOSPIROSIS (WEIL'S DISEASE)	Rats, dogs, swine, cattle, wild animals	Fever, headache, pinkeye, yellow jaundice	Vaccination of farm animals and pets; control of infected animals and rodents; protective boots and gloves.
BOVINE TUBERCULOSIS	CATTLE	Same as human tuberculosis-cough, fever, weight loss	Control of infected animals; pasteurization of milk.
ERYSIPELOID	Poultry processing	Painful swollen fingers	Gloves; proper attention to cuts and scratches.

DISEASE	SOURCE	SYMPTOMS	PREVENTIVE MEASURES
TULAREMIA (RABBIT FEVER)	Wild rabbits and other rodents	Ulcer at entry site followed by headache, fever	Use gloves when handling carcasses of wild rodents.
FUNGUS DISEASES			
FARMER'S LUNG	Mouldy hay	Cough and fever after exposure	Proper storage and handling of hay; dust respirators.
ASPERGILLOSIS	Mouldy hay, peat moss	Cough, fever, asthma	Dust respirators.
HISTOPLAMOSIS	Chicken, bat, pigeon droppings	Usually none; may cause fever, cough	Water or oiling of contaminated soil; dust respirators.

CONCLUSION

You must be constantly aware of the unique behavior of individual animals and the effect the environment (weather, equipment and people) can have on that behavior. Because of the complex interaction of these factors, animal behavior can never be predicted. No animal is 100 per cent reliable.

The Alberta Farm Accident Survey revealed that cattle are involved in more farm accidents than any other farm animal. However, there are more fatal accidents involving horses than cattle. The largest proportion of these accidents occur inside buildings. Therefore, it's very important to recognize the danger of provoking or startling any penned animal. Recognizing the diseases that may be contracted from handling livestock and how to prevent contracting these diseases is also important. Since farmers and farm workers have extensive exposure to animals and because many of the diseases they may contract cannot be fully cured, it is extremely important to be able to prevent these diseases.

CHAPTER 4

TOOL SAFETY

INTRODUCTION

Until recently, saws, hammers, screwdrivers and wrenches were all the tools a farmer needed. However, modern farming requires an increasing number of tools to repair and maintain machinery. Unfortunately, some farmers neglect to care for their tools. Tools are often left unprotected, lying wherever they were last used. Neglect and general disrespect for tools breed accidents. Care of tools is an important aspect of farm safety.

Did you know that:

- The third leading cause of accidents on Alberta farms is misuse of tools?
- Most of the tool accidents result in HAND-ARM injuries?
- Forty per cent of tool accidents involve tools slipping off material being worked on and the hand being pinched or caught?
- Nearly 50 per cent of tool accident victims spend a minimum of seven days recovering before a full work load is resumed?
- Eye injuries resulted from 40 per cent of grindstone accidents.

When it comes to handling tools, most people do it pretty casually. Hand tools are so common it's easy to take them for granted. After all, what's a little cut or a scraped knuckle? The attitude that "everybody knows how to use them" often results in injuries.

Stan was cutting a tree for firewood. He was using a chain saw for the first time. Before he had finished cutting it, the tree started to fall, but not in the direction he thought it would. He pushed the tree with his left hand and continued to cut while holding the saw in his right hand. Because he had little control of the saw, it fell out of the notch, dropped down, and cut through his pants and into his leg. Stan was severely injured and couldn't work for several months. He had to hire extra help to keep up his farm.

Rob was attempting to remove a staple from a fence post. He drove a screwdriver underneath the staple with a hammer so he could pry it out. The screwdriver broke, sending a piece of metal into his forehead. The metal was so deeply imbedded, Rob had to wait several months for the wound to heal before he could undergo surgery to have it removed.

SAFE HANDLING OF TOOLS

Most hand tool accidents are caused by failure to:

- use the right tool
- use a tool properly
- keep edged tools sharp
- replace or repair a defective tool
- store tools safely

Most of us know that the right tool makes a world of difference when it comes to getting a job done safely, quickly and efficiently. Unfortunately many of us simply don't have enough tools in enough sizes to handle every job.

This leaves a choice of buying or borrowing the needed tools or trying to "make do" with tools at hand. "Making do" with a substitute causes many accidents.

To eliminate the dangerous and unsafe practices that result in the majority of tool-related farm accidents, several procedures should be followed.

- The tool selected for the job should be designed for that job, e.g., screwdrivers should not be used as wedges or chisels. All tools should be sturdy enough for the job at hand.
- The tool should be in good working condition. Tools such as files or chisels with loose handles, dull saws with improperly set teeth that vary in height, dull axes, mallets with damaged heads, and hammers with greasy heads should never be used.
- The tools must be correctly used. When using sharp instruments, pressure should always be applied away from, never toward the body. A wrench should always be pushed with an open palm, so fingers will not be injured if the tool slips. Stationary tools should be fastened securely. Screwdrivers should only be used if they fit properly into the head of the screw.
- When using power tools, the electrical switch should always be within easy reach of the operator. Many accidents occur when flying particles produced by grinders and other parts of tools become embedded in eyes and other parts of the body. Make sure proper protective equipment is worn. Always have firm control of power tools so you don't come in contact with the cutting, grinding or drilling components or drop the tool on yourself. Disconnect power before attempting to adjust or repair a power tool.
- All tools should be stored properly, that is securely fastened in a properly identified spot, with all cutting edges protected. Keep workshop areas clean and be careful where you step.
- Be especially careful when welding. Oxyacetylene welding produces an extremely hot flame. Acetylene gas is very explosive, so gas leaks must be constantly guarded against. The arc in electric welding can cause temporary blindness if proper protective equipment is not used.

CONCLUSION

Farm accidents involving tools are the third most common type of accident reported in Alberta. Tool safety is important and easy to practise since the worker has more control in this area than in activities such as livestock handling. Basically, tool safety involves correct use of the proper tool which is in good condition, while wearing appropriate protective clothing. Neglect or failure to maintain tools is unsafe and can lead to accidents. If tools were used in a safe manner, the incidence of farm accidents would decrease substantially.

CHAPTER 5

CHEMICAL SAFETY

INTRODUCTION

From time to time most farms use chemicals. Their safe use is a must. Yet every year, time, work and lives are lost because of unsafe and irresponsible chemical handling. Although chemical accidents are few, those that occur tend to be severe.

To handle farm chemical safety, read the safety information for all chemicals each time you use them. Every farm chemical is packaged with complete instructions on safe usage, conditions where it should and should not be used and recommendations for accident treatment. If the instructions don't appear on the container, they may be inside the package. If you can't locate instructions, ask others if they have them and if any special precautions should be taken. If you are unsure about any chemicals, check with the nearest representative of Alberta Agriculture.

SAFETY PROCEDURES

Spraying

Thirty per cent of all chemical accidents occur while spraying, handling containers and mixing chemicals. Therefore, the first concern is proper spraying procedures. Before spraying, read the instructions and follow all precautions on the label.

RULES FOR CHEMICAL SAFETY

- Before handling pesticide containers, inspect them for leaks.
- Do not handle containers roughly or carelessly.
- Should a leak or spill occur, keep people and animals away from the area; report immediately and decontaminate thoroughly.
- Do not store pesticides or empty pesticide containers anywhere near food or drink intended for human or animal consumption.
- Do not keep food, drink, tobacco, cups or cutlery near work areas or in work clothes.
- Do not eat, drink or smoke in a work area.
- Do not rub the eyes or touch the mouth while working with pesticides.
- Wash hands before eating, drinking, smoking or using the toilet.
- Wear clean rubber gloves and recommended protective clothing when handling pesticides and an approved respirator where recommended.
- Always dispose of contaminated clothing or faulty protective covering, especially gloves.
- Read the label carefully. If seeking medical aid, take the label for the physician's information.
- Have washing facilities as close as possible to mixing and loading sites.
- Never mix any chemicals unless it is recommended on the label or by the proper authority.
- Use only equipment designed for the job and in good mechanical condition.

Symptoms Which Indicate Pesticide Poisoning Has Occurred

Mild Poisoning — Mild symptoms may lead to severe symptoms. Headache, fatigue, skin irritation, loss of appetite, dizziness, weakness, nervousness, nausea, perspiration, diarrhea, eye irritation, thirst, sore joints.

Moderate Poisoning — Moderate symptoms may lead to severe symptoms. Nausea, trembling, lack of muscular co-ordination, excessive saliva, blurring of vision, feeling of constriction in the throat and chest, difficulty breathing, flushed or yellow skin, abdominal cramps.

Severe Poisoning — Vomiting, loss of reflexes, inability to breathe, uncontrollable muscular twitching, constriction of pupils, convulsions, unconsciousness, fever.

Decontamination[8]

Successful decontamination requires:

- plenty of soap and water
- extreme thoroughness
- speed

If the skin or clothing of a person becomes contaminated, speed is vital. Decontamination must be quick and efficient:

- Remove all contaminated clothing immediately.
- Scrub the contaminated area vigorously with soap and water.
- Wash again with soap and water. Wash the hair.
- Rinse with clean water.
- Sponge the contaminated area with alcohol to remove any remaining pesticide. Put on a clean set of clothing. Destroy all contaminated clothing by burning.

If possible, use different sprayers and equipment for herbicide and insecticide application. If you must use a herbicide sprayer to apply other chemicals be sure it is thoroughly decontaminated.

Avoid contaminating water supplies when filling a spray tank and when draining or rinsing the tank.

When filling tanks from a ditch, dugout or other water reservoir, use a check valve on the pump to prevent the chemical mixture from being siphoned back into the water supply. This is mandatory under the Agricultural Chemicals Act.

Store herbicides well away from other pesticides, seed or fertilizer. Keep all surplus chemicals in the original containers and ensure they are labelled **DANGEROUS**. Dispose of empty containers safely. Containers, other than those that are pressurized, can also be burned. Never inhale the fumes from burning chemical containers. Keep all containers away from animals and children. Full and partially full chemical containers should be stored and locked in a building away from people and animals. Always keep chemicals in their original containers.

Handling Chemically Treated Produce

- Chemically treated seed is poisonous. It should never be fed to animals or sold for feed or milling purposes. Delivering treated seed to an elevator may lead to conviction under the Canada Grain Regulations, Act 74, which carries a maximum fine of $1,000.
- Before garden produce is eaten, it should be thoroughly washed to remove any insecticide residue, grit, grime and germs.

Gasoline Tanks

Several injuries reported to Alberta Agriculture involved gasoline. Most people realize the extreme danger gasoline poses, however, accidents continue to happen. Please keep these procedures in mind.

- Gasoline vapors explode violently. If a gasoline tank needs welding, make sure the tank, including the small surge pot inside, is empty and flushed out. Vapors can linger in an apparently empty tank.
- Storage cans must be kept away from open flames.
- In addition to open flame welding, smoking or electrical sparks can set off a gasoline explosion anywhere gasoline vapor has accumulated. Never refuel machinery or use gasoline where these ignitors may be present.

Compressed Air

- Always wear face protection when using compressed air. Any particle flying in the air can cause eye damage.
- Never fool with an air hose or use it to clean your clothing. High air pressure can seriously injure soft parts of the body. Air can also be forced into a cut or wound, forming a bubble in the blood which can kill a person.

Dangerous Gases

Silo Gas — Silo gas is a combination of carbon dioxide and nitrogen oxide produced by fermenting silage. Silo gas produces little human discomfort, yet working in an area where silo gas has accumulated can lead to unconsciousness and death. If possible, do not enter the silo for three weeks after filling it. Ventilate the silo room by keeping outside doors and windows open for at least two weeks after filling. If it is absolutely necessary to enter the silo within the third week, then remember to:

- Provide adequate ventilation in the silo, silo chute, silo room and any other connecting rooms or buildings by running the blower for at least 15-20 minutes.
- Never go in alone.
- Be sure there is a way out.
- Use a life line before entering dangerous areas.
- Use a self-contained breathing apparatus. It is the only device that will protect you from these gases.

Liquid Manure Gas — Liquid manure gas is composed of ammonia, hydrogen sulphide, carbon dioxide and methane. All are produced during decomposition of organic material. Although liquid manure gas is continually produced, special danger exists when liquid manure is agitated or emptied from the storage area. Agitation forces the gas to separate from the liquid and enter the air. The gas is especially dangerous because it attacks the nervous system very quickly. Any human being or animal that inhales a large concentration of liquid manure gas can die instantly. Before agitating liquid manure, be positive there is adequate ventilation and protection. Never enter any area where the gas may be present without a self-contained breathing apparatus.

Hydrogen Sulphide (H_2S) — The deadliest gas, commonly found in sewers, is caused by decomposition of organic matter. Small amounts in air have a rotten egg smell, but higher amounts kill the sense of smell. Concentration of H_2S over 0.02 per cent can cause unconsciousness within a few minutes. Unless the victim is removed from the area, death will follow very quickly.

Methane (Natural Gas) CH — This gas is usually caused by a leak in a gas line but it is also the byproduct of backed up or sluggish sewers. The gas is not poisonous but it may displace oxygen below the point necessary to maintain life. The chief danger is its explosive nature.

Carbon Monoxide (CO) — Carbon monoxide is a colorless, odorless, tasteless and very poisonous gas. It is the product of incomplete combustion.The most common source is the exhaust of gasoline motors. Never allow motors to operate near an open sewer unless precautions are taken to ensure that the exhaust gases are directed away from the opening.

Carbon Dioxide (CO_2) — Carbon dioxide is a heavy gas, therefore, it can collect in manholes, wells, tanks and garbage dumps. It does not diffuse or mix readily with air. High concentrations in the aforementioned places can remain for considerable lengths of time. Intoxicants from CO_2 cause excitement, headache, drowsiness, weakness and dizziness.

Nitrogen (N_2) — The only danger of inhalation or absorption of nitrogen lies in diluting the oxygen from the air to a point so low that it can no longer support life. Nitrogen acts as an asphyxiant.

Gasoline — Gasoline is found in storm and sanitary sewer systems from either leaking underground storage tanks or the dumping of gasoline into the system. It is a flammable liquid and a dangerous fire hazard.

PROPERTIES OF COMMON GASES

GASES	EXPLOSIVE	ODOR	HEAVIER THAN AIR	DANGER
Hydrogen Sulphide	Yes	Yes	Yes	Deadly poison
Methane	Yes	No	No	Asphyxiant
Carbon Monoxide	Yes	No	Same as air	Deadly poison
Carbon Monoxide	No	No	Yes	Asphyxiant
Nitrogen	No	No	Same as air	Asphyxiant
Gasoline vapors	Yes	Yes	Yes	Asphyxiant

Safe Manure Handling:[9]

- Move animals out of the barn during manure removal time.
- Be sure buildings are well ventilated. Open all doors before handling any manure.
- Be sure air movement in the barn is adequate. If it is calm, wait for a breezier day.
- Never enter a manure pit and be careful when working at floor level when handling manure. Liquid manure gas is made up of carbon dioxide, methane, ammonia and hydrogen sulphide. (Check above chart for characteristics of these gases).
- If not sure of the correct procedures for safe manure handling, check with the local district agriculturist for assistance.

Anhydrous Ammonia

Anhydrous ammonia is used in agriculture as a fertilizer and is applied directly to the soil. Anhydrous ammonia is a combination of nitrogen (N) and hydrogen (H), designated in chemical notation as NH_3.

Characteristics — At atmospheric pressure, anhydrous ammonia is a gas. For transporting and storage, ammonia is compressed to a liquid. In high concentrations, when released to the atmosphere, the vapor looks like dense steam.

Ammonia is colorless and very corrosive to living tissue. It has a sharp, pungent smell and can be sensed in very small amounts. Larger concentrations will sting the nose and throat and make the eyes water. These warning signs tell you to:

- Get upwind or out of the vapor.
- Put on a proper respirator before trying to find the leak.
- Apply a water spray downwind of the leak to absorb the vapor.

Storage — Storage areas should be dry, well ventilated and maintained at normal room temperature. At 16° C, 87.5 per cent of the cylinder volume is occupied with liquid ammonia. Because of its high coefficient of expansion, at about 63° C the cylinder would be completely full with liquid ammonia.

Cylinders should not be stored:

- Near flammable materials such as oil, gasoline and waste.
- Near other chemicals which could react with ammonia should a leak occur, e.g., chlorine, mercury, silver oxide.
- Adjacent to any source of direct heat or sparks, e.g., furnace, electrical equipment, etc.

How to Handle an Emergency — These steps should be followed in an emergency:

- Evacuate persons who are downwind from a major discharge and keep spectators at a safe distance. (Area of evacuation depends on size of leak, wind direction, wind fluctuation and wind strength. If help is required, summon the local RCMP).
- Apply water through fog-nozzle to point of leakage.
- Leaks that cannot be stopped should be neutralized by applying water from an upwind location to a point just downwind of the leak.

Do not apply water to anhydrous ammonia vessel and do not apply water to liquid anhydrous ammonia.

Attempts should only be made to neutralize anhydrous ammonia vapors downwind of the source.

First Aid — Exposure to liquid or high concentrations of vapor can cause severe burns. Excessive inhalation may cause severe damage to the lungs or even suffocation. The agent for controlling ammonia emergencies and the first aid treatment for exposure is water . . . lots of it and quickly. Flush or irrigate exposed area with water for at least 15 minutes.

WARNING — Do not apply salves, ointments or oils to an ammonia burn for at least 24 hours. Contaminated clothing should be removed as soon as practical. Because of the freezing action of anhydrous ammonia, clothing may be frozen to the skin. If this happens, thaw with water. Keep victim warm and get him to a doctor. If breathing has stopped, begin artificial respiration.

CONCLUSION

Agricultural chemicals are indispensable in modern farming. They can be safe to use with normal precautions. The nature of each chemical determines the particular safety hazard and the safe method of avoiding the hazard. The secret to handling farm chemicals safely is to read and carefully follow the safety instructions provided with each chemical. When working in storage bins or silos, always remember to ventilate the area fully before entering. Always be doubly cautious when working near potentially explosive vapors and gases.

CHAPTER 6

ELECTRICAL SAFETY

INTRODUCTION

Electricity within the farm yard has become one of the most essential services to our farms. Few things we use from day-to-day in our homes and in agricultural work have greater potential to do us harm than electricity.

A healthy adult can be fatally injured if as little as 60 milliamperes of current passes through his chest. This is approximately the amount of current used by a 7.5 watt Christmas bulb.

Electrical systems will function almost indefinitely if properly installed, not overloaded and not physically abused.

A large percentage of farm and ranch electrical injuries and fatalities result from contact with overhead power supply lines which have become a part of the rural landscape. Equipment commonly involved in such contacts are portable elevators and augers, irrigation pipes and harvesting equipment. Family members and employees using high clearance devices must continually be made aware of the danger of contact with overhead power lines.

The remainder of this chapter will deal with electrical hazards, where they may occur, how to avoid electrical accidents and first aid tips as recommended by St. John Ambulance.

WHEN WILL ELECTRICAL HAZARDS OCCUR?

The Alberta Farm Safety Program has found that the major sources of farm electrical injuries and fatalities are:

Contacting Overhead Power Lines With:

- harvesting equipment
- irrigation pipes
- grain bin/tall buildings
- piled grain
- hay stacks

Poor Location of Power Lines and Electrical Equipment Such as:

- running into power poles and electrical equipment with machinery
- short circuit by power lines crossing or contacting one another
- maintenance and accessibility problems
- proximity to animals
- children's recreational activities (e.g., flying kites)

Contacts With Buried Cables During:

- trenching
- backhoeing
- digging fence post holes
- drilling water wells
- general construction and excavation

Using Improper Equipment Such as:

- using indoor equipment or devices outdoors
- switches and outlets near flammable vapors
- not grounding extension cords or devices
- worn out sockets, cords, outlets, etc.

HOW TO AVOID ELECTRICAL HAZARDS

Every individual within the farm yard should be aware of potential electrical hazards and where they may occur.

Tall Equipment (10 ft or greater)

When moving tall equipment under power lines, contact your local power company for assistance.

Proximity to Power Lines

Try to locate or build activities so they do not conflict with overhead power lines and electrical facilities.

Buried Cables

During excavating or digging within the farmyard, again, contact your local power company for assistance.

Equipment Usage

If you are not qualified to do electrical work, consult with a professional. The added cost now will save you trouble later.

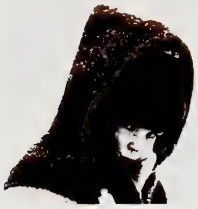
CONCLUSION

Time is one of the vital factors affecting the farm. In an effort to save time and make life easier, the farming industry is becoming more and more machine dependent. As a result, electricity as a source of energy and power is becoming increasingly necessary within the farmyard. As electricity is made more available and becomes more relied upon, the potential for electrical accidents and hazards increases tremendously. By educating farm people, an awareness is made of potential electrical accidents and the necessary preventive measures can be taken.

This chapter on ELECTRICAL SAFETY is our effort to identify some of the major sources of electrical hazards and how they may be avoided. It is our effort to create within you an awareness of electrical hazards and to prevent an accident from happening.

LOOK UP AND LIVE!

CHAPTER 7



DANGER: DEEP WATER

INTRODUCTION

The Alberta Farm Safety Program believes that accidental drownings don't have to occur.

They don't have to occur because reservoirs, dugouts and irrigation ditches can be fenced and marked off-limits.

They don't have to occur because children can be warned about the dangers of deep water.

Accidental drownings are accidental, and accidents can be prevented.

ACCIDENTAL DROWNING DEATHS

Children 16 Years and Under 1975 - 1984

1982
- 3-year-old male fell into a septic tank.
- 1-year-old male drowned in water well.

1981
- 11-year-old male drowned in irrigation canal while swimming; he was caught in a strong current.
- 4-year-old male was playing at the edge of a dugout when he waded into the water and drowned.

1979
- 3-year-old female fell through the thin ice of a sewage lagoon.

1978
- 16-month-old male was playing with his brother when he fell into a slough.
- a 4-year-old male wandered away from home and fell in a water filled ditch.

1977
- 5-year-old male drowned after diving into an irrigation ditch.

1976
- 5-year-old male drowned in an irrigation canal while attempting to swim across it.
- 13-year-old male drowned in an irrigation canal when he slipped off his inner tube.
- 6-year-old male drowned in slough while playing with his friends
- two 3-year-old males fell into a dugout and drowned.
- 13-year-old male drowned when the tractor broke through thin ice.
- 11-year-old male slipped into a dugout and drowned.

1975
- 3-year-old male fell into farm dugout and drowned.
- 2-year-old female found floating face down in farm dugout.
- 7-year-old female fell into a dugout while trying to get water for the chickens.

AREAS OF CONCERN

Does your family know the dangers of:

- Skating on thin ice?
- Swimming, boating or fishing while unsupervised?
- Slipping on steep muddy banks?

Are your cattle safe from:

- Breaking through thin ice?
- Slipping down steep muddy slopes into the dugout and eventually drowning?

SOLUTIONS

- Dugouts should be fenced and marked off-limits to keep out children.
- Dugouts and reservoirs used for irrigation should be fenced. The slopes should be levelled and planted with grass to increase soil stability.
- A snow fence (supported by good posts), barbed wire or wooden fence provides an effective barrier preventing people and animals from accidentally falling into a manure or sewage storage system.
- A wooden fence keeps animals out of a dugout. A pump and hose will provide water for the livestock on dry solid ground.

CONCLUSION

Some dugouts, if they are inaccessible to the public, will probably not require specific fencing (other than property boundary fencing).

However, if a dugout or water reservoir is near a public access area:

- Some type of fencing should be provided.
- Warning signs describing the danger of a specific hazard and declaring it off limits should be posted.
- Signs may also be placed on perimeter boundary fences.

All liquid manure and sewage storage systems should be:

- Fenced or guarded in some manner.
- Posted with suitable warning signs and all points of entry secured.

CHAPTER 8

SAFETY EQUIPMENT

INTRODUCTION

Safety requires constant alertness. If you spot a bad situation, correct it if you can, and if you must expose yourself to hazards, then use all safety equipment and procedures at your disposal.

HOW TO PROTECT YOURSELF

Head

The most common head hazard is an unseen blow to the head. It's an unusual sort of injury because you seldom have any warning. Fortunately, most just hurt, but some cause death.

Hard Hats — The hard hat is the best head protection money can buy. It gives protection in two ways: where there is a chance of something falling on you or where there is the possibility of bumping your head. However, a hard hat won't protect against a falling object moving with enough force to break your neck. Always be aware of where you are working, including what's going on above you. Most modern hard hats can be worn constantly without any discomfort. Some models are even equipped with acoustical ear muffs which can be swung out of the way when not needed.

Bump Caps — Bump caps are lighter than hard hats and are usually made of softer plastic. These caps aren't made to protect against heavy blows or falling materials. However, they do afford good protection anywhere there is the possibility of bumping your head, such as in a confined space.

Hair — Hair is often an overlooked hazard — especially long hair. Getting hair entangled in machinery can result in a painful scalping. Even worse, the head can be sucked into the machine with gruesome results.

Long hair has a tendency to fall where it shouldn't, e.g., in grease, paint or liquid manure. If your hair is long, tie it back, braid it or tuck it under your hat. Perhaps you should even think of cutting it.

Eyes

Eyes are very vulnerable organs. Few eye injuries are minor, and every one is painful.

There are three basic types of eye protection. Using the appropriate kind can eliminate critical injuries from everyday hazards such as sparks, wood chips, blowing soil or chemical splashes.

Safety Glasses — Safety glasses are made of toughened glass or plastic that can withstand more impact than ordinary glass. However, safety glasses or ordinary glasses with shatter-resistant lenses, can only protect from the front of your face. Be sure your protective glasses have side shields.

Safety Goggles — Safety goggles effectively enclose the eyes in a protective cover and provide better protection from impacts, fumes and splashes than safety glasses can. Vented goggles prevent fogging and provide for better wearing comfort.

Face Shields — Face shields offer the most protection where there is danger of eye or facial injury from flying sparks, particles or heat. If there is a high probability of impact, we recommend wearing safety glasses or goggles under the shield.

Sunglasses — A good pair of sunglasses is a necessity for outdoor workers. Long hours in bright sunlight without protection can cause eye strain, headaches and fatigue, a leading cause of accidents. In the long term, permanent eye damage may result. Only sunglasses with hardened lenses should be worn.

A Reminder — Although a dust speck in the eye may not seem a great hazard, the resulting distraction, especially when working on machinery, could result in an unfortunate accident.

Ears

Ear Protectors — There are two basic types of ear protectors:

- Ear muffs
- Ear inserts

Muffs with varying abilities to cut down noise are available. The lighter weight models should be adequate for all but the noisiest jobs. They are ideal when noise exposure is intermittent or if it is of relatively short duration. They can also be worn for longer periods, for example when operating tractors. Ear inserts are available as preformed or custom-molded plugs made of rubber or plastic. Cotton is next to worthless and should not be used. Ear plugs used for swimming do not offer sufficient protection.

Ear protectors should be able to reduce noise by around 30 dB. Because many farm machines sound off at 100-110 dB at the operator's ear, such protection would reduce noise levels entering the inner ear to a safe 70-80 dB.

Although ear protection cuts down on noise, it will not prevent you from hearing how your equipment is functioning. By cutting back on loud noise, the quieter sounds seem to come through quite well, you will be able to hear the "trouble" sounds.

Ear muffs may be purchased from a safety supply company, local stores and some farm supply stores. Noise is too loud when:[10]

- You have difficulty talking to someone in a noisy place.
- Your ears ring after prolonged exposure to noise.
- Speech and other sounds seem muffled after exposure.
- You lose the ability to tell musical tones apart.
- You fail to hear high pitched sounds.

Hearing Loss Due to Farm Noises — A U.S. public health service study showed that farmers have a high incidence of hearing loss. Prolonged exposure to excessive noise is a slow but sure way to go deaf.

Farm noise sources that may contribute to hearing problems include tractors, harvesters, blowers, choppers, grinders, chain saws, fire arms, fireworks, lawn and garden equipment, portable and stationary power tools, and recreational vehicles.

Inner ear hearing loss once was thought of as an ailment which afflicted older people. Now, many young farm residents exhibit definite hearing loss, which is believed to be partly due to operating noisy farm equipment from an early age.

In addition to permanent hearing damage, excessive noise can cause nervousness, fatigue, irritability, reduce work output, give rise to errors and perhaps cause accidents.

With constant abuse by strong sounds the inner ear begins to suffer damage. The first to go is the ability to hear sounds around 4,000 cycles, such as the upper range of a piano. The next to go is the ability to hear frequencies between 500-3,000 cycles, crucial to understanding conversation.

Off-and-on noise is less damaging than constant noise because the ear tends to recover after a short rest. Your ears can be exposed without harm to very strong sounds, perhaps 110 dB if exposure is brief, whereas the ears of a man sitting all day on a tractor that produces less sound, 95 dB, will suffer greater damage.

Decibel Levels of Common Sounds at Typical Distance from Source —

0 Acute threshold of hearing
15 Average threshold of hearing
20 Whisper
30 Leaves rustling, very soft music
40 Average noise level of an average household
60 Normal speech, background music
70 Noisy office, inside auto 60 mph
80 Heavy traffic, window air-conditioner
80-85 Inside acoustically insulated protective tractor cab in field
90 Occupational Safety and Health Administration, U.S.A. limit — hearing damage on excessive exposure to noise above 90 dB
100 Noisy tractor, power mower, snowmobile, motorcycle, in subway car
120 Thunder clap, jackhammer, basketball crowd, amplified rock music
140 Threshold of pain — shot gun, near jet taking off, 50 hp siren

Respiratory System

Because farm workers are surrounded by fresh, clean country air, they may find it hard to believe that certain hazards can adversely affect lungs and the upper respiratory tract.

Dust and gas are the two major dangers. Solid airborne particles of soil, grain, or chemical can settle in your lungs as dust and cause great damage. To protect against dust, use a filter or chemical cartridge mask. Masks are usually made of soft plastic and are fitted with either a fibrous filter or a chemical cartridge containing an absorbent material. Remember, these masks only protect against dust or weak gas. They don't protect against dangerous gas or oxygen deficiencies. Supplied-air respirators or self-contained breathing apparatus are the only safety devices which can be used in these circumstances. Both devices supply clean air and are completely closed to the surrounding environment. Self-contained breathing apparatus should always be used where dangerous gas, such as manure or silo gas, may be present.

Hands

A farm worker constantly uses his hands. Cuts, blisters and splinters are accepted facts of life. Small injuries may be a simple annoyance, but if left untended, infection could enter and become a big problem.

Gloves are one answer. They are great hand-savers and help workers avoid infection. Always use rubber gloves when handling chemicals.

When washing up, use a hand cleaner rather than solvents or gasoline. These harsh liquids can cause skin damage that will lead to nasty infections. They are also fire hazards.

Other Personal Safety

Concern with personal safety must not end when work is done. Highways, beaches, the kitchen, and even the bedroom are potential accident areas.

General rules for personal safety are:

- Avoid prolonged exposure to direct sunlight. Sunstroke is a serious danger. The best protection is a hat and proper clothing. On hot days wear clothing made of wool or cotton and button up so as little skin as possible is exposed.
- When lifting heavy objects, put the strain on your legs, not your back.
- Keep a first aid kit handy and use it for every injury, no matter how minor it may seem.

The table below presents a summary of personal safety equipment needed for specific farm jobs.

PERSONAL SAFETY EQUIPMENT NEEDED FOR SPECIFIC FARM JOBS

Job	High Hazard To These Body Part(s)	Equipment Needed For Protection
Building, construction, demolition, maintenance, and repair	Head, eyes, hands, feet	Hard hat or bump cap, safety glasses or goggles, leather gloves, barrier cream, safety shoes.
Operation of farm machinery	Eyes, ears, hands, feet, and if dusty or chaffy, lungs	Safety glasses or goggles, ear plugs or muffs, leather gloves (except near moving parts), barrier cream, safety shoes, filter respirator.
Handling and applying agricultural chemicals	Lungs, eyes, skin	Cartridge respirator or gas mask, face shield, goggles, protective garments and gloves made of rubber or plastic, footwear impervious to chemicals.
Farm shop work, using power tools, also repair and maintenance of farm equipment	Head, eyes, hands, feet, and on some jobs, ears, skin and body	Bump cap, safety glasses or goggles, leather gloves, barrier cream, safety shoes, aprons, ear muffs or plugs.
Welding	Eyes, face, hands, other exposed body parts	Tinted welding goggles, face shield, heavy leather gloves, arm and body cover.
Felling and trimming trees	Head, eyes, hands, feet and if using chain saw, ears	Hard hat, safety glasses or goggles, leather gloves, safety shoes, ear muffs or plugs.

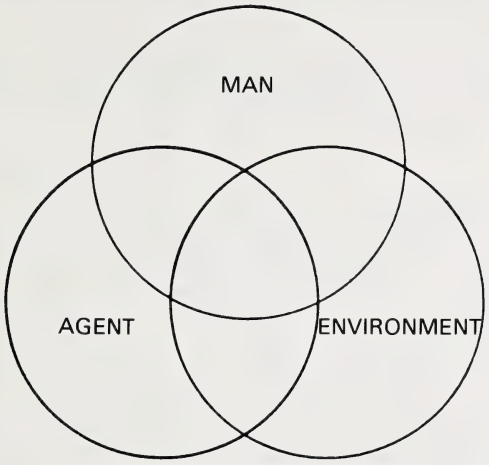
Operating power mowers	Feet, eyes, and if the machine is noisy, ears	Safety shoes, safety glasses or goggles, gloves (best hand protection is to stay away from hot or moving parts), ear plugs or muffs.
Electrical work	Any part in contact with electrical source, hands	Non-conductive safety hat and shoe soles, rubber gloves made for electrical work.
Farmstead cleanup and routine maintenance	Eyes, hands, feet, if in close quarters, head, and if dusty, lungs	Safety glasses or goggles, leather gloves, barrier cream, bump cap, filter respirator, safety shoes.
Handling cattle, horses, hogs	Feet	Safety shoes.
Work in oxygen-deficient or toxic atmosphere	Lungs and possibly skin, eyes and feet	Self-contained or supplied air breathing device.
Spray painting	Lungs, eyes, skin, hands	Cartridge respirator for some paints, filter respirator with most, goggles, also hat, clothing and gloves impervious to paint, barrier cream.
Grinding feed, operating noisy farmstead materials, handling machinery, etc.	Ears, if dusty, eyes and lungs, hands, feet, and if in close quarters, head	Ear plugs or muffs, dust mask, goggles, safety shoes, bump cap, leather gloves.
Driving snowmobiles, trail bikes, ATV's, cycles	Head, eyes, and if machine is excessively noisy, ears	Bump cap or helmet, goggles, ear muffs or plugs.

CONCLUSION

Although accidents may occur by chance, the majority of accidents can and should be prevented. Approximately 80 per cent of all accidents are caused by human error. Those resulting from bad habits and attitudes make up the largest number. Constant safety awareness is the only way to avoid accidents.

SUMMARY

An accident is the combined result of three factors: an agent, environment and man.



An agent (machinery, livestock, tools, chemicals, etc.) simply presents a hazard. Ninety-nine per cent of all hazards will never lead to an accident even if safety precautions are not taken. One per cent will. The problem is deciding which hazards fall into that category.

Hazards can also be controlled so an accident need never happen. What is required is an awareness of the hazards and a basic understanding of how they cause accidents. This will teach us how to avoid them.

The second factor, environment, can seldom be changed, yet at the same time it should never be taken for granted. Our environment is often unpredictable and uncontrollable. However, we can still adapt working habits to lessen the possibility of an accident. Being constantly aware of your environment, and its possible effects on the job you are doing, will reduce the chance of an accident.

The third factor, man, usually determines if an accident occurs. Assuming most people would rather not have an accident, it's hard to understand why so many accidents do happen.

Workers often know their actions are unsafe, and yet they continue in the same pattern. Result? — accidents. Why? Being safe does cost time. Workers may believe they don't have that time. Experience may also be the culprit. If an unsafe act has never produced an accident, workers often have no incentive to change. It boils down to attitude; a poor attitude can be a sure path to destruction. The fact is, if a worker does not take enough time to be safe and he does lose an arm, it's probable the work will never get done. Man has the ability to make his working environment safe. Whether or not he exercises this ability depends on his attitude. If a worker thinks about the possible consequences of an action, i.e., losing a arm, spending his life in a wheelchair, or dying, will he then realize that the little extra time it takes to be safe is worthwhile? Don't answer that question too quickly. Are you sure of your answer? Soon you're going to have to put it to the test.

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[1] Kyeremanteng & Taylor, 1975, p. 3.

[2] Strasser, Aaron, Bohn & Eales, 1973, p. 313.

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APPENDIX A

FIRST AID ON THE FARM

St. John Ambulance, Canada's first aid authority, produced these first aid tips. We heartily recommend that you also take their first aid course to be prepared for any accident which may happen.

Eye Injuries

- Eye injuries must be treated with extreme care. Lacerated eyelids usually bleed profusely and should be treated as any case of bleeding. Lacerations of the eyeball are serious and pressure should not be applied. Simply cover the eye with a soft pad of gauze or other dressing and arrange for immediate medical aid.
- If the eyeball is perforated by a flying object such as a wood or metal splinter, do not remove the object. Cover the eye with a paper cup or cardboard cone to prevent movement of both eyes and get immediate medical attention.
- If the eyes come in contact with a strong corrosive chemical, move very quickly. Chemical powder, such as lime, should be brushed away from the eye and a liquid or solid corrosive should be flushed out of the eye with slow running water for at least 10 minutes. Immediate medical aid is required.

Heat Exhaustion

This is caused by exposure to excessive heat, especially moist heat, and is often accompanied by diarrhea or vomiting. Some of the following signs and symptoms may be present: muscular cramps, headache, dizziness, exhaustion, pale skin, weak pulse, rapid and shallow breathing and cold, clammy skin. Place the person at rest in a cool place and give them something cool to drink. If there has been excessive sweating, diarrhea and vomiting, give salted water to drink.

Heat Stroke

A very serious illness, which may be preceded by heat exhaustion, heat stroke is caused by high temperatures and hot drying winds or high humidity and poor circulation. Symptoms are: a flushed face and hot, dry skin; temperature in the 40°C (104°F) range; full, pounding pulse, noisy breathing; restlessness; headache and dizziness. Unconsciousness may develop quickly and convulsions may occur in the young. The casualty may die unless the body temperature is reduced. To do so remove his clothing and bathe in cold water by immersing in a cold bath or wrapping him in a wet cold sheet. Obtain medical aid immediately.

Unconsciousness

Unconsciousness can be caused by many conditions such as a blow on the head, shock or diabetes. If the person is not breathing begin mouth-to-mouth artificial respiration immediately. Control severe bleeding if present. Never leave an unconscious person alone or on his back. Give nothing by mouth and keep the person warm. Any person who has been unconscious should be seen by a physician.

Artificial Respiration

When breathing has stopped because of drowning, suffocation, strangulation, electrical shock, or a heart attack, it is vitally important to move quickly. Do not take time to search the mouth for foreign matter. Begin mouth-to-mouth artificial respiration immediately.

- Lift the neck with one hand and tilt the head back with the other hand so that the chin points almost upwards. This action will open the airway.
- Pinch the nostrils tightly and keep pressure on the forehead with one hand to prevent the tongue from falling to the back of the throat and blocking the airway.
- Take a deep breath, place your opened mouth over the casualty's mouth making a tight seal and blow into the casualty's mouth.
- The first four full inflations should be given as quickly as possible not allowing time for the lungs to fully deflate. This action forces air sacs to fill rapidly and saturate the blood with oxygen.
- If the chest fails to rise, air is not getting into the lungs. There may be an obstruction or the head may not be positioned correctly. Check for and remove any obstruction by sweeping the finger around the inside of the mouth and throat. Tilt the head well back and start again.
- After four quick breaths, if air is getting into the lungs, continue breathing one full breath every five seconds.
- After each inflation raise your mouth away from the face to allow air to escape. Listen for air coming out of the lungs and watch for the chest to fall.
- For an infant or young child, the technique is basically the same. Blow into both the child's mouth and nose every three seconds **using gently puffs or air sufficient to cause the chest to rise but not strong enough to cause lung damage.**

Bleeding

Most bleeding can be stopped by applying pressure on the wound and by elevating the injured part. To control severe bleeding, apply hand pressure or a clean cloth if available. If one dressing becomes bloodsoaked, don't remove it, just place another over it.

Fractures

A fracture may be recognized by the following symptoms: pain made worse by movement; tenderness; swelling; deformity and the snapping sound of the bone or the noise of the bone ends grating together. Before you move the injured person to hospital, you must immobilize the fracture. The best way to do that is by splinting it. Before you do that apply traction. This is not done to force the fractured bone back into place, but it may be necessary to straighten a broken limb to prevent further damage.

Now you are ready to splint the fracture. A splint can be made of anything handy — a broom handle, newspaper or magazine, blanket or pillow. An uninjured part of the body can also be used as a splint. If the leg is broken, for example, take a folded blanket or towel and very gently place it between the legs to act as a buffer. Once this is done you can immobilize the fracture by firmly bandaging the two legs together both above and below the fracture.

A broken ankle can be easily immobilized. After applying traction, support the ankle by tying a pillow around it. If no bandages are available, use whatever is handy. A towel, skate lace or scarf, for example, will do.

For a broken wrist, after you've immobilized the fracture, place the injured arm in a sling which can be made from anything, like a tie, towel or scarf.

With a fracture or suspected fracture, the most important thing to remember is not to move the person unless threatened by a greater danger such as fire.

First Aid for Electrical Injury

Low Voltage Electrical Injuries:

- don't touch victim.
- break contact by normal methods, i.e., switch off the current or remove the plug.
- if the above is impossible, stand on dry insulating material and use rubber or dry wood to push victim away from contact with electricity.
- administer artificial respiration if necessary.
- cover burns with sterile dressing.
- seek medical aid.

High Voltage Electrical Injuries:

- do not attempt a rescue until cable or conductor has been shut off by the local power company.
- treat injuries according to their priorities — respiration, bleeding, shock, fractures, then other.
- remember, high voltage electricity can jump a considerable gap, so stay back.
- seek immediate medical aid.

First Aid Kit

If your farming activities take you some distance from the farm house, it is wise to carry a first aid kit.

TO CONTROL BLEEDING

A first aid kit to control bleeding can be assembled from items you already have on the farm. The first requirement is a suitable container for the contents. Possibilities include an old school bag, an ice cream or honey pail, or a large plastic container. The first aid kit could hang from the back of the seat in the tractor, combine or truck.

Suggested contents:

- 4 disposable diapers or 6 sanitary napkins (to serve as pressure bandages)
- 12 bandaids
- 1 roll of tape (hockey, electrical or adhesive)
- 1 pair of scissors
- 4 large safety pins
- 2 triangular bandages (an old sheet can be used to make into dressings or bandages. Some hotels and hospitals have old sheets available for interested organizations).
- 6 gauze pressure dressings (again, strips from old sheets can be used).

TO SAVE A LIMB

If an accident occurs where a limb is amputated, the limb may be able to be reconnected if it is handled properly. Place the severed limb in a bag to keep it clean.

Suggested contents for "Save a Limb Kit":

- 1 large garbage bag
- 4 regular garbage bags
- 4 bread bags (must be waterproof)
- 4 sandwich bags
- A first aid book should be placed in all first aid kits.

TRAINING IN FIRST AID REDUCES ACCIDENTS AND SAVES LIVES

APPENDIX B

FIGURES AND DATA ON FARM ACCIDENTS

All figures and data presented in this appendix were collected by the Farm Accident Monitoring System and reflect all accidents reported to November 1985. Statistics on accidents resulting in death and those producing injuries will be presented separately. The types, conditions and consequences of all accidents monitored in the present survey can be seen in the following figures.

Sources of data

i Farm Accident Monitoring System-information on farm accidents resulting in injuries as reported to 36 Alberta hospitals.

ii. Chief Medical Examiner's Office — information on farm accidents resulting in fatalities.

iii. Department of Transportation — highway accidents involving farm equipment.

iv. Fire Prevention Branch, Alberta Labour — information on farm fires in Alberta.

v. Electrical Protection Branch — information on electrical accidents on farms in Alberta.

Combined Data From All Surveyed Accidents

DATA

COMBINED DATA

FIGURE 1 — LOCATION OF ACCIDENT

JUNE 1976 – NOVEMBER 1985

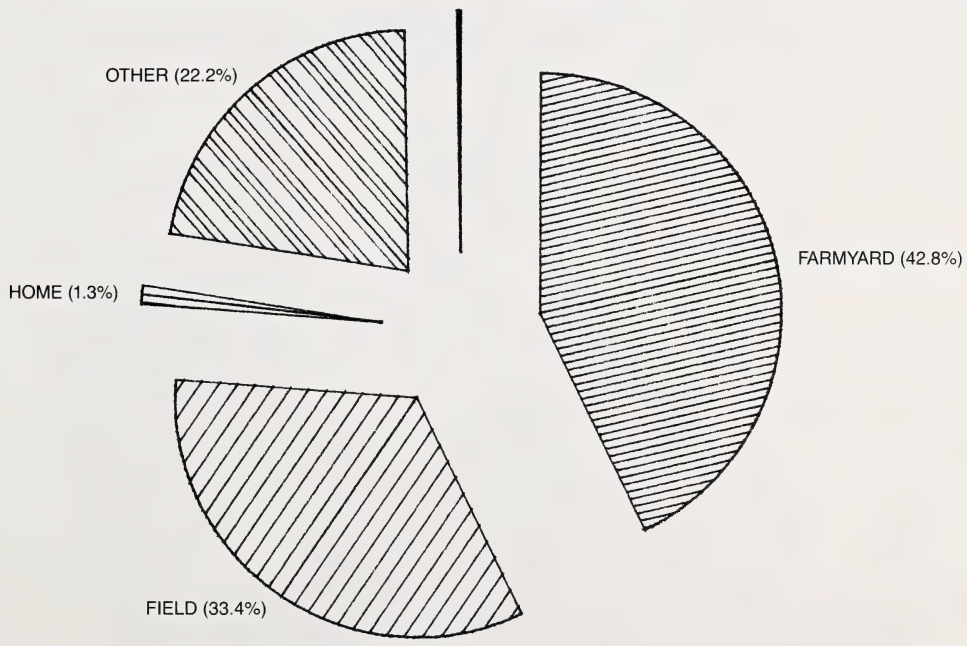


FIGURE 2 — ACTIVITIES OF VICTIMS

JUNE 1976 – NOVEMBER 1985

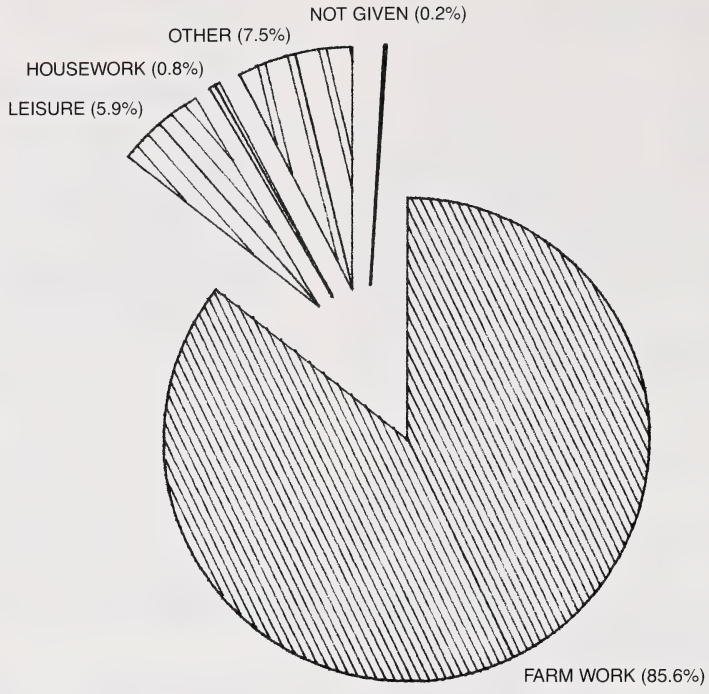


FIGURE 3 — SERIOUSNESS OF INJURY

JUNE 1976 – NOVEMBER 1985

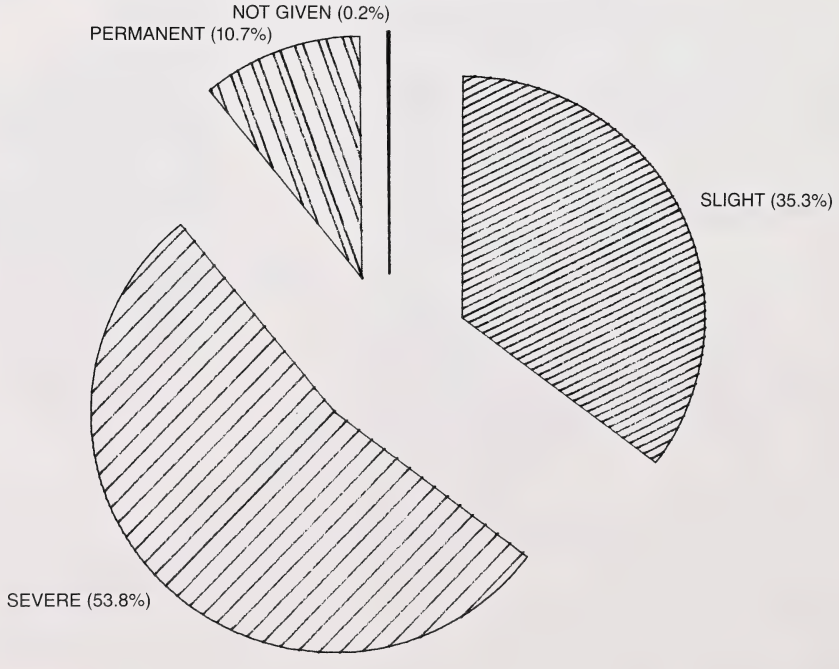


FIGURE 4 — PARTS OF BODY INJURED

JUNE 1976 – NOVEMBER 1985

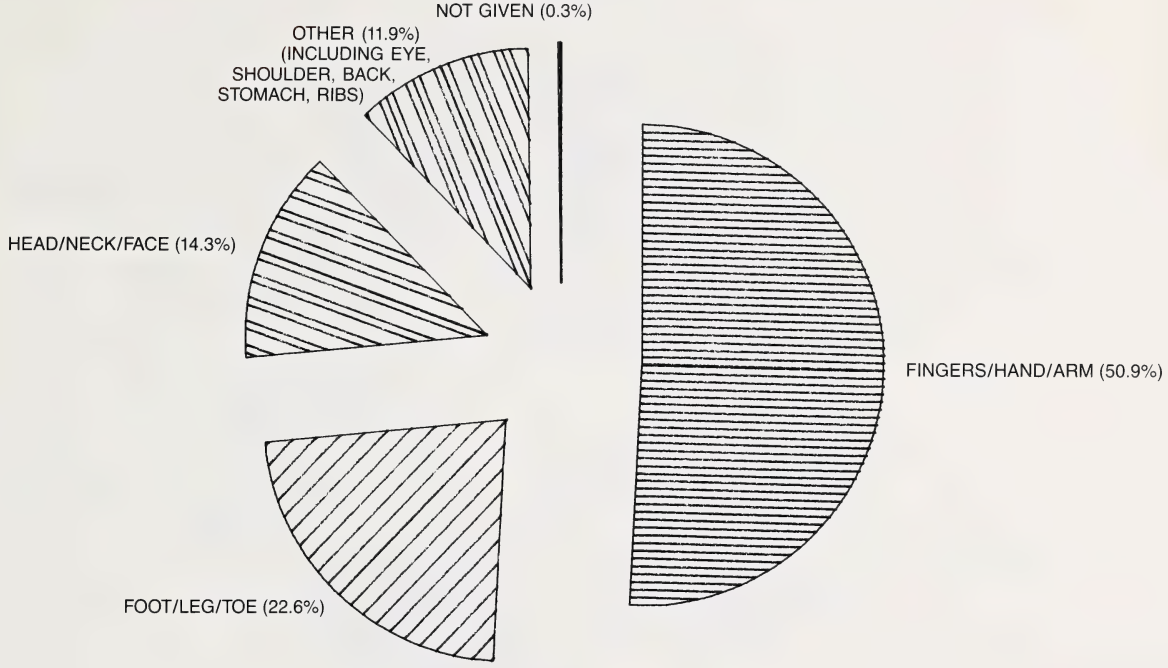


FIGURE 5 — TIME OF ACCIDENT

JUNE 1976 – NOVEMBER 1985

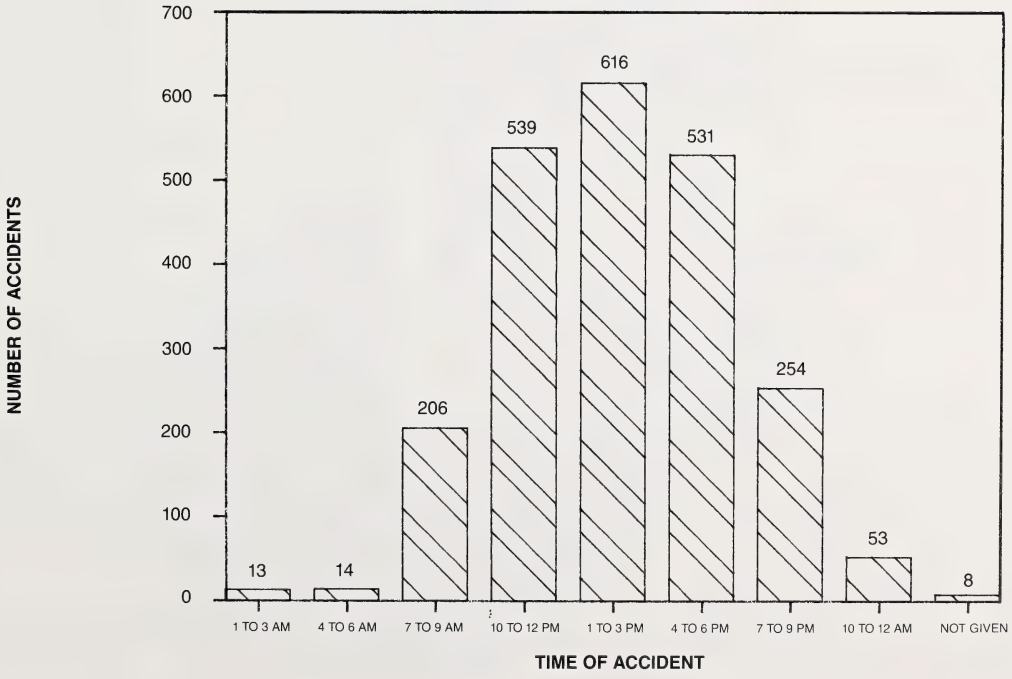


FIGURE 6 — DAY OF WEEK

JUNE 1976 – NOVEMBER 1985

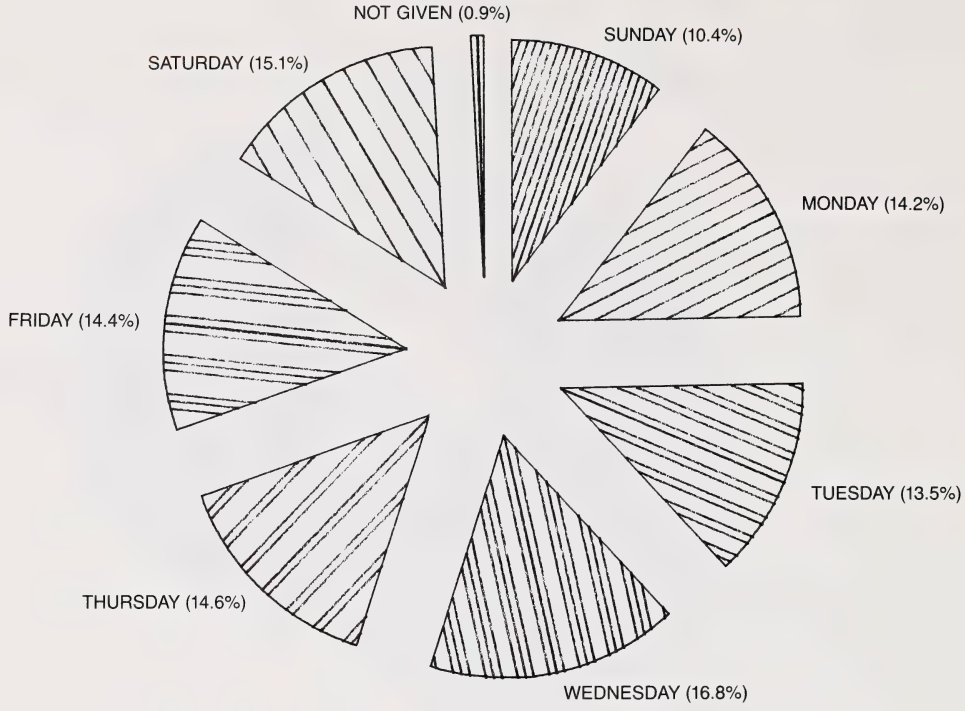


FIGURE 7 — TYPE OF FARMING

JUNE 1976 – NOVEMBER 1985

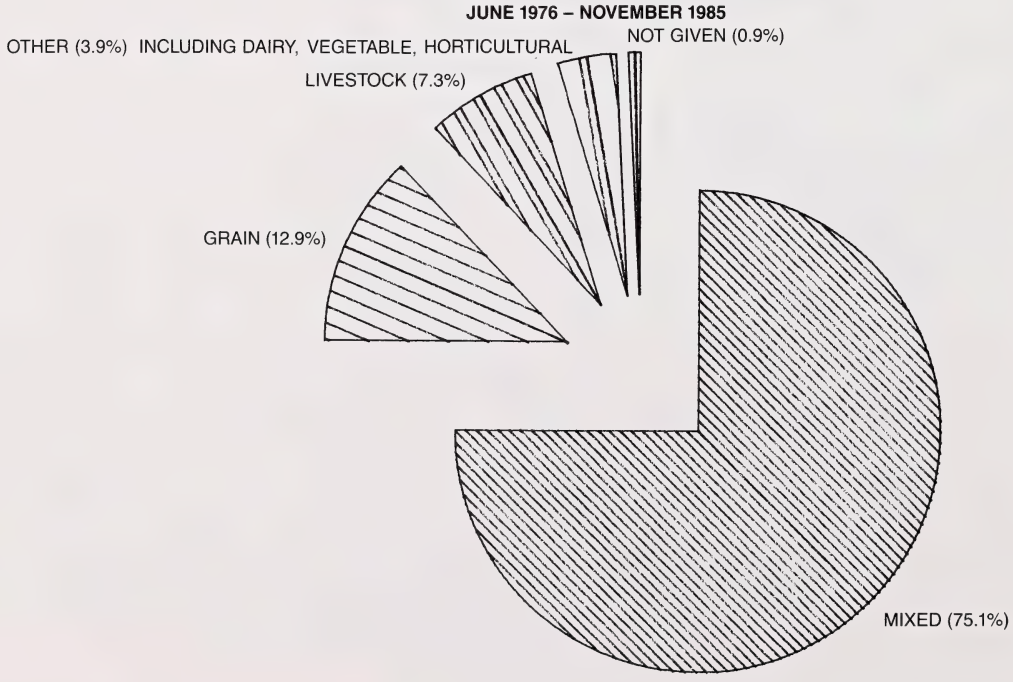


FIGURE 8 — AGE OF VICTIM

JUNE 1976 – NOVEMBER 1985

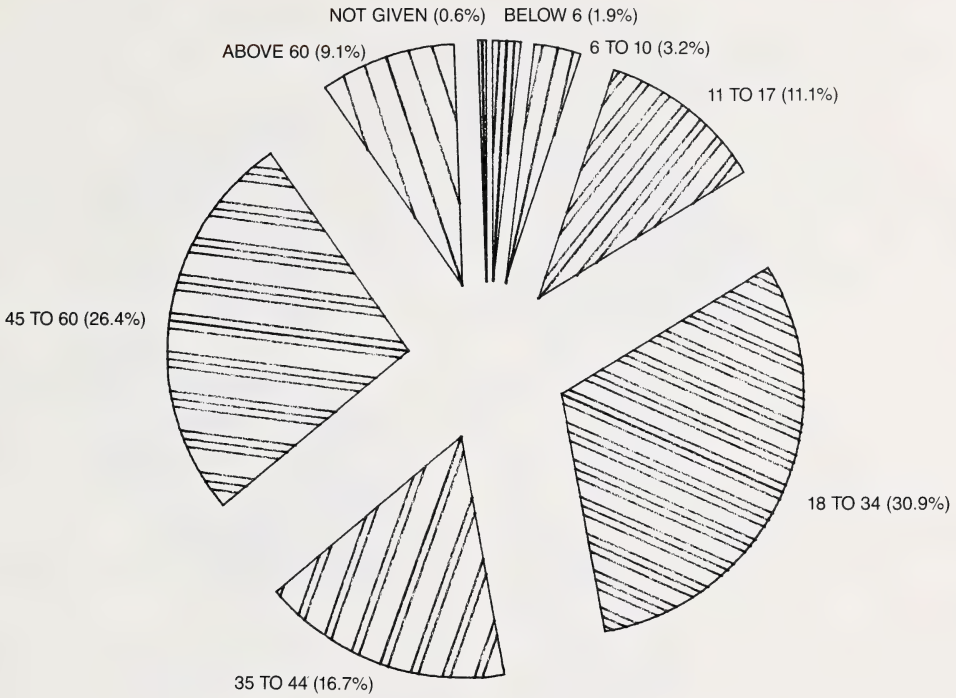


FIGURE 9 — MONTH OF YEAR

JUNE 1976 – NOVEMBER 1985

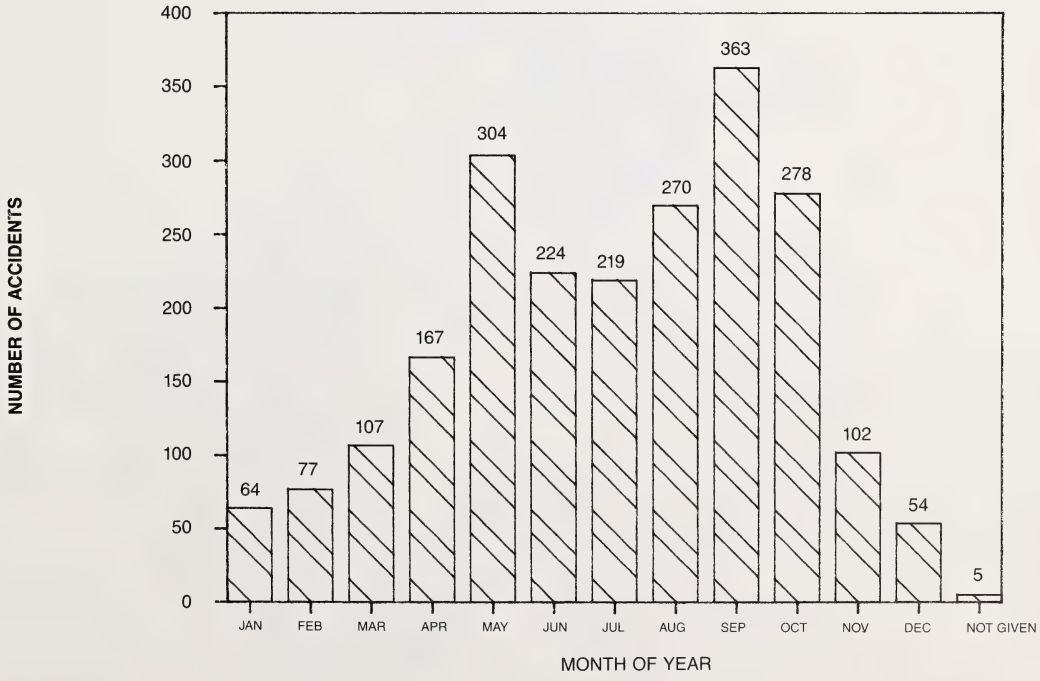
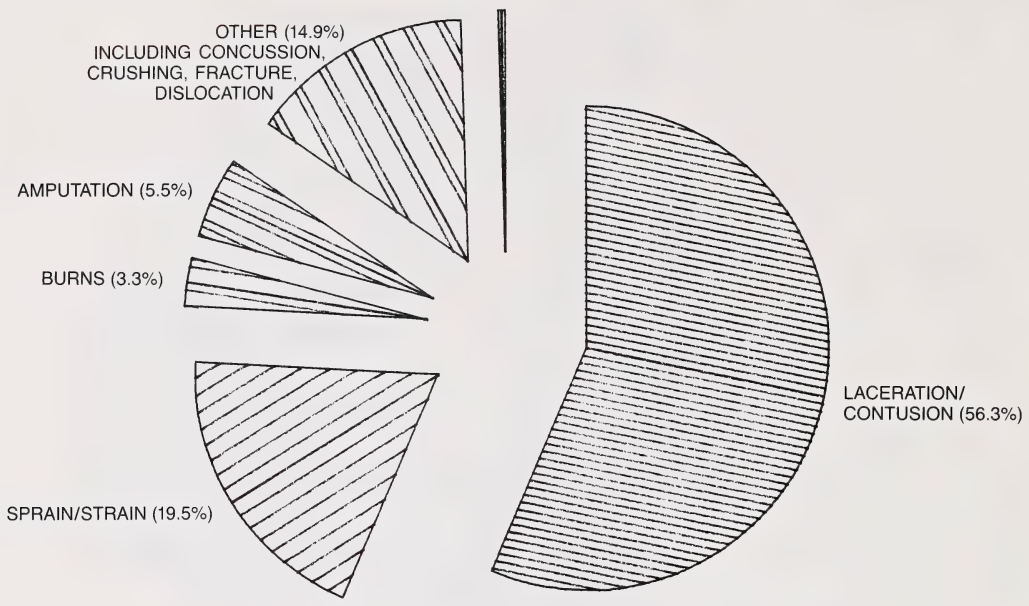


FIGURE 10 — NATURE OF INJURY

JUNE 1976 – NOVEMBER 1985



COMBINED DATA

FIGURE 11 — AGENTS INVOLVED

JUNE 1976 – NOVEMBER 1985

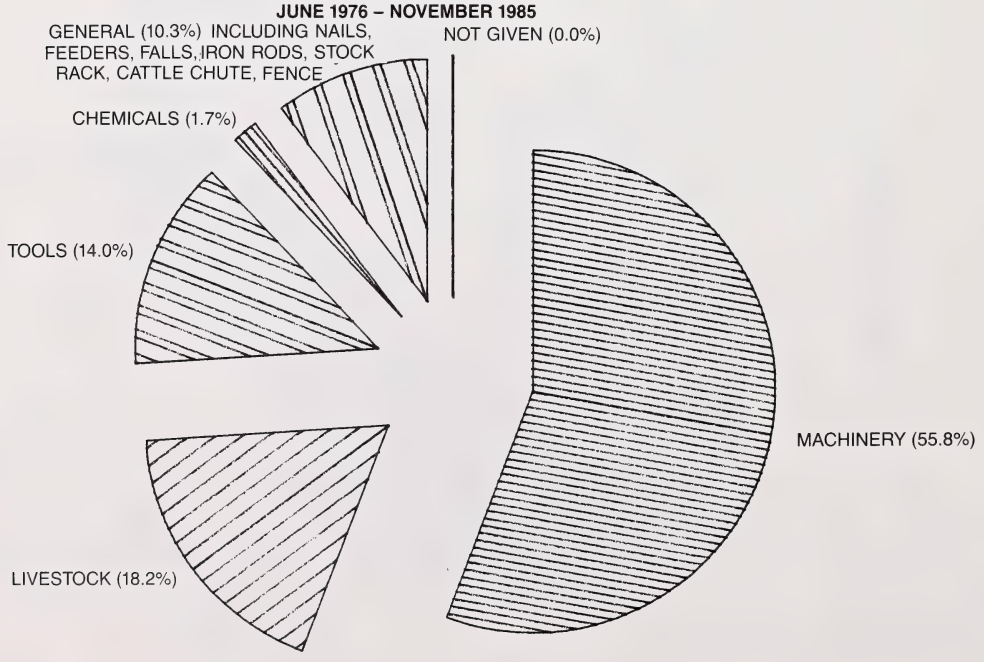

GENERAL (10.3%) INCLUDING NAILS, FEEDERS, FALLS, IRON RODS, STOCK RACK, CATTLE CHUTE, FENCE
NOT GIVEN (0.0%)
CHEMICALS (1.7%)
TOOLS (14.0%)
MACHINERY (55.8%)
LIVESTOCK (18.2%)

FIGURE 1.1 — TYPE OF MACHINERY

JUNE 1976 – NOVEMBER 1985

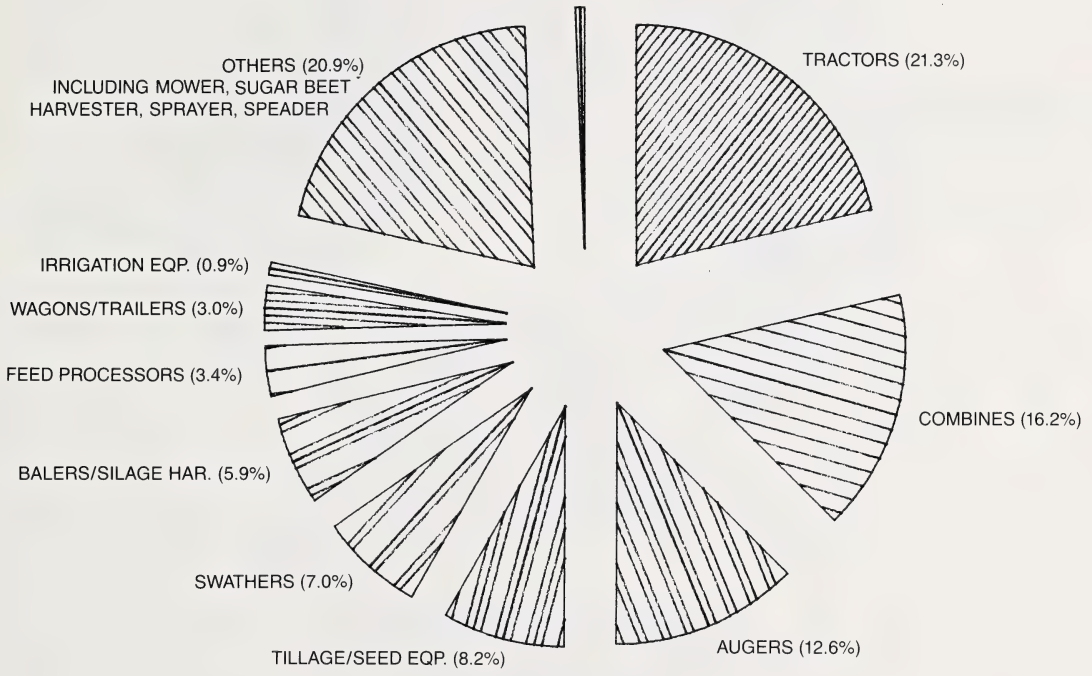


FIGURE 1.2 — PART OF MACHINE

JUNE 1976 – NOVEMBER 1985

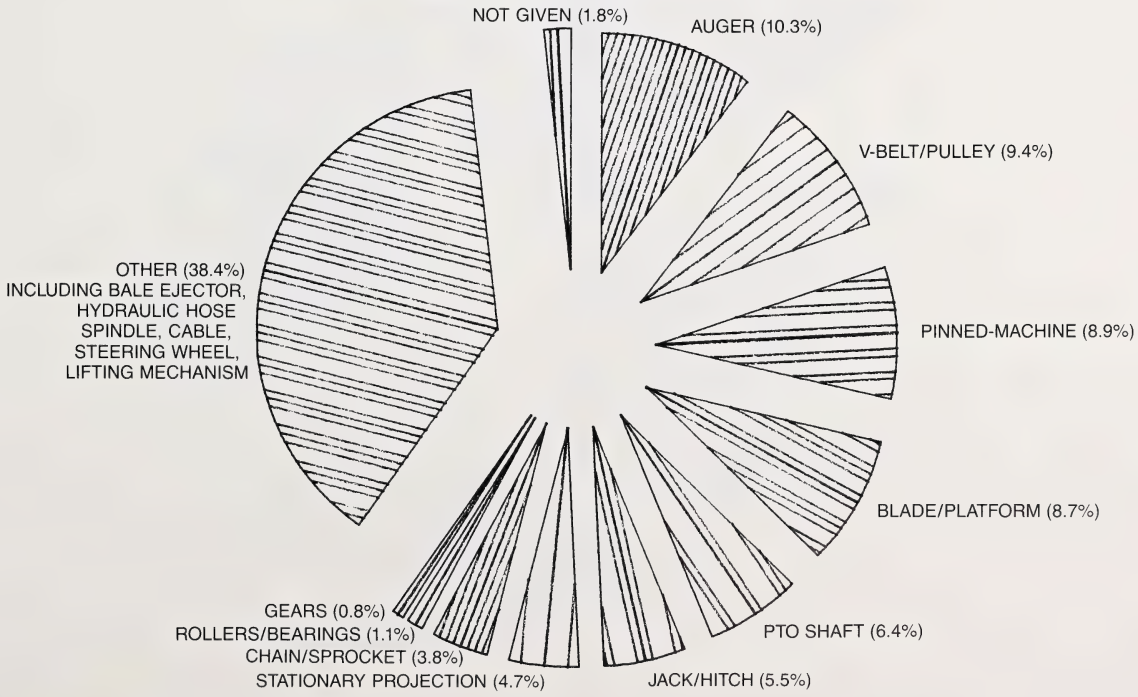


FIGURE 1.3 — HOW ACCIDENT OCCURRED

JUNE 1976 – NOVEMBER 1985

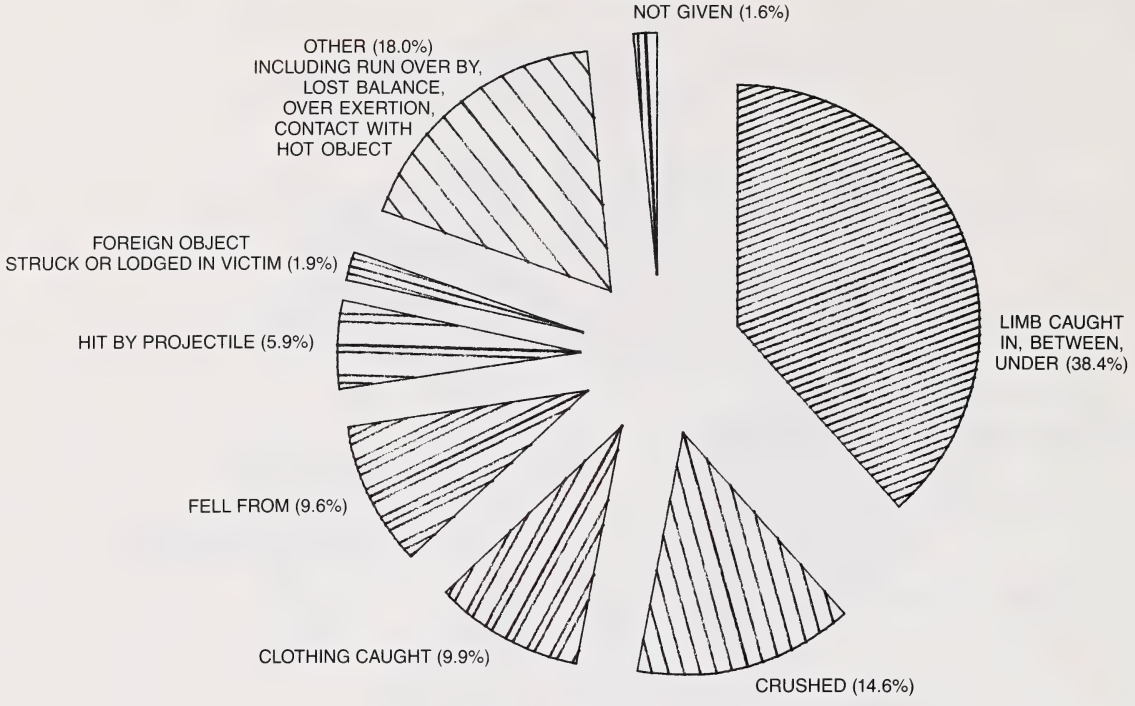

NOT GIVEN (1.6%)
OTHER (18.0%) INCLUDING RUN OVER BY, LOST BALANCE, OVER EXERTION, CONTACT WITH HOT OBJECT
FOREIGN OBJECT STRUCK OR LODGED IN VICTIM (1.9%)
HIT BY PROJECTILE (5.9%)
LIMB CAUGHT IN, BETWEEN, UNDER (38.4%)
FELL FROM (9.6%)
CLOTHING CAUGHT (9.9%)
CRUSHED (14.6%)

FIGURE 1.4 — ACTIVITY OF VICTIM

JUNE 1976 – NOVEMBER 1985

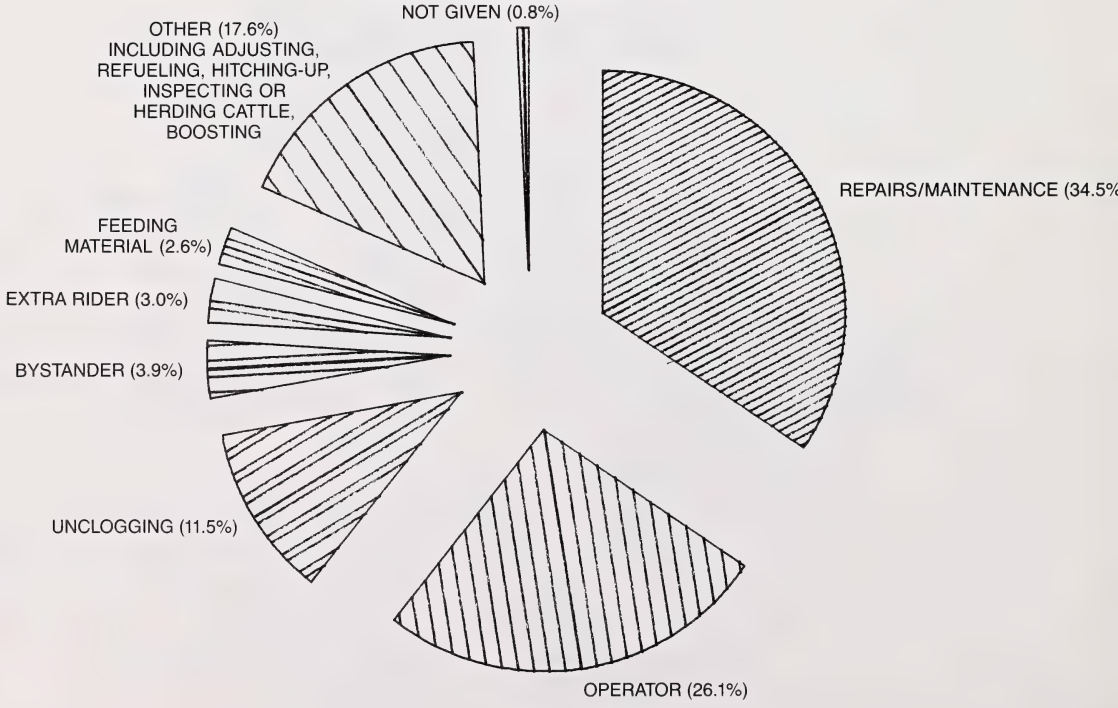
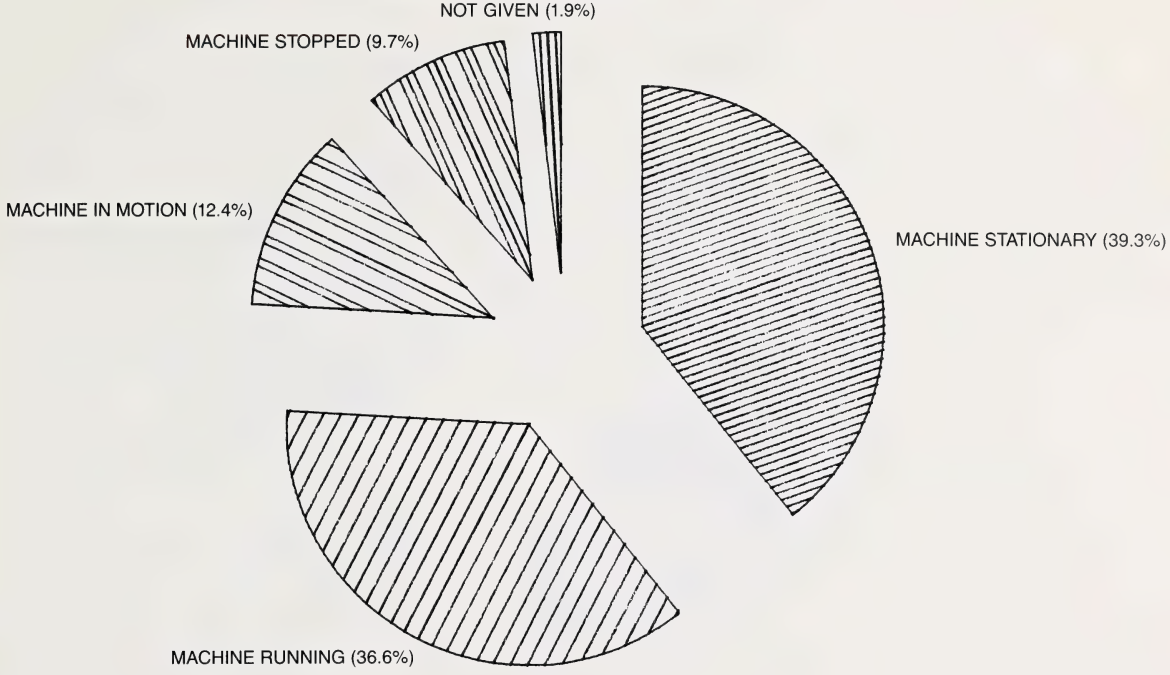


FIGURE 1.5 — STATE OF MACHINE

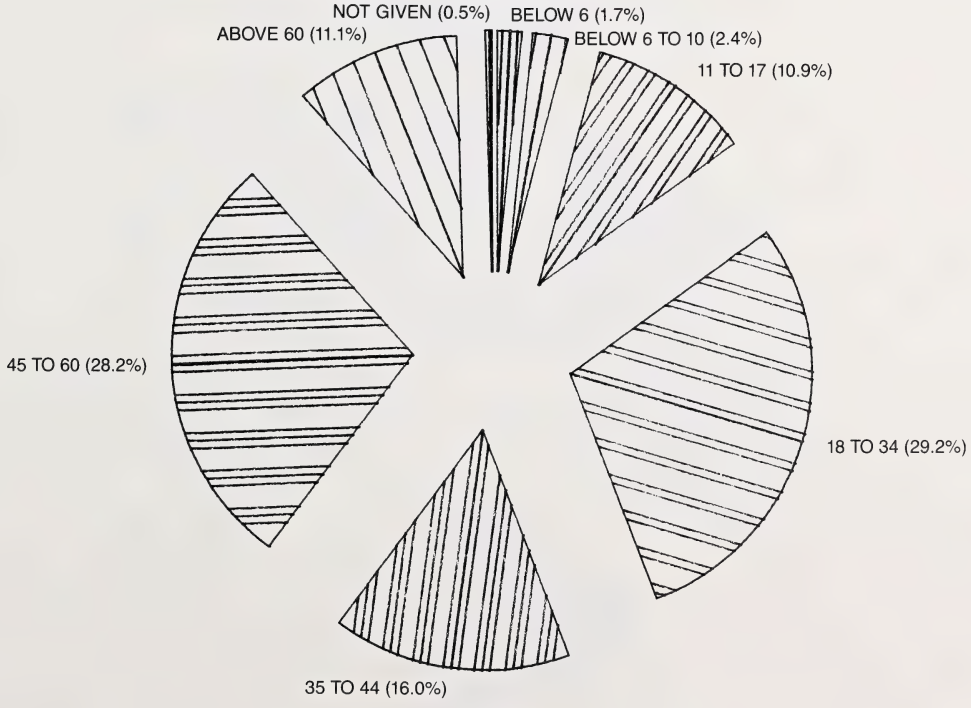
JUNE 1976 – NOVEMBER 1985



FARM MACHINERY

FIGURE 1.6 — AGE OF VICTIM

JUNE 1976 – NOVEMBER 1985



HIGHWAY ACCIDENTS

FIGURE 2.1 — NUMBER OF ACCIDENTS

1981 – 1985

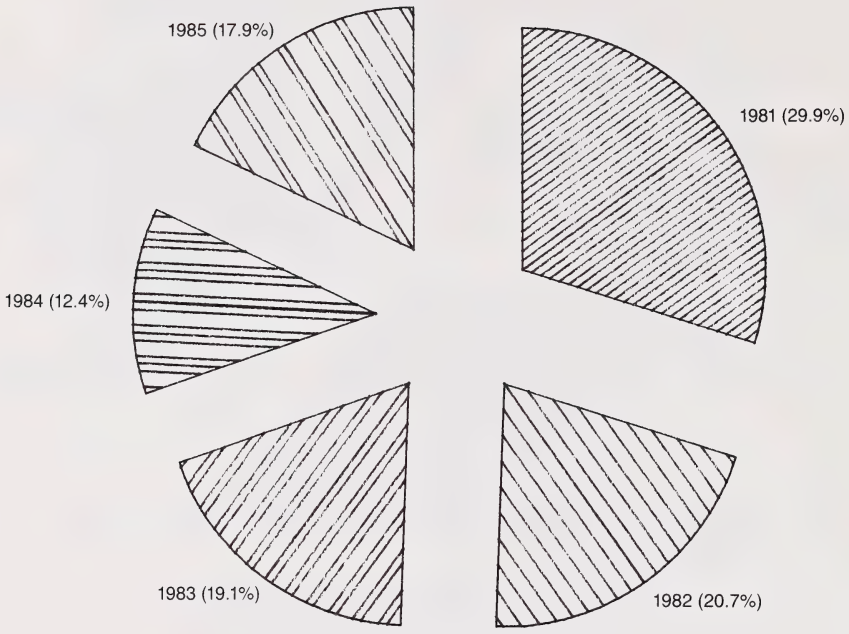


FIGURE 2.2 — MONTH OF YEAR

1981 – 1985

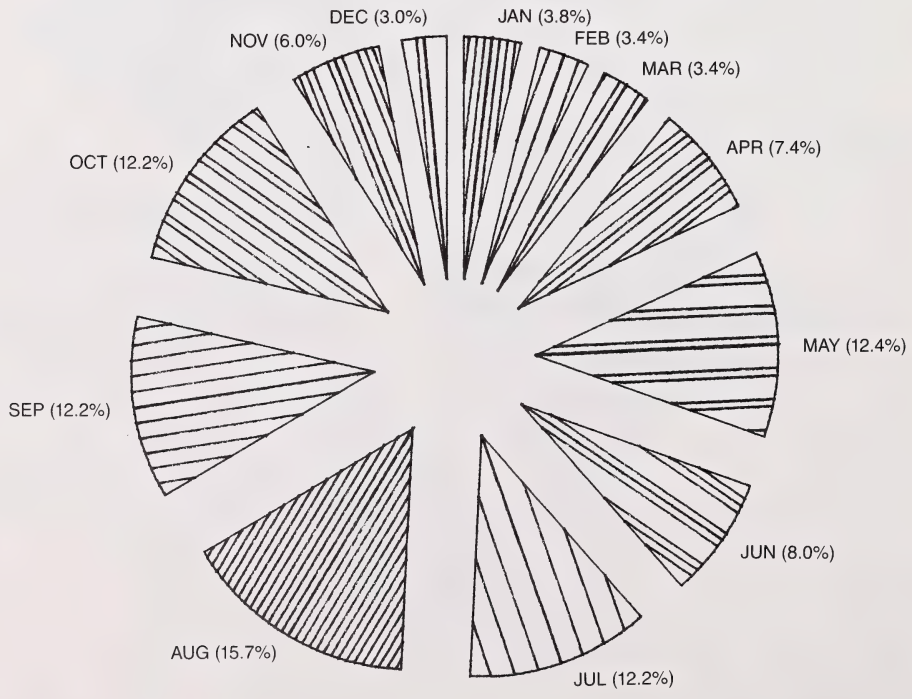
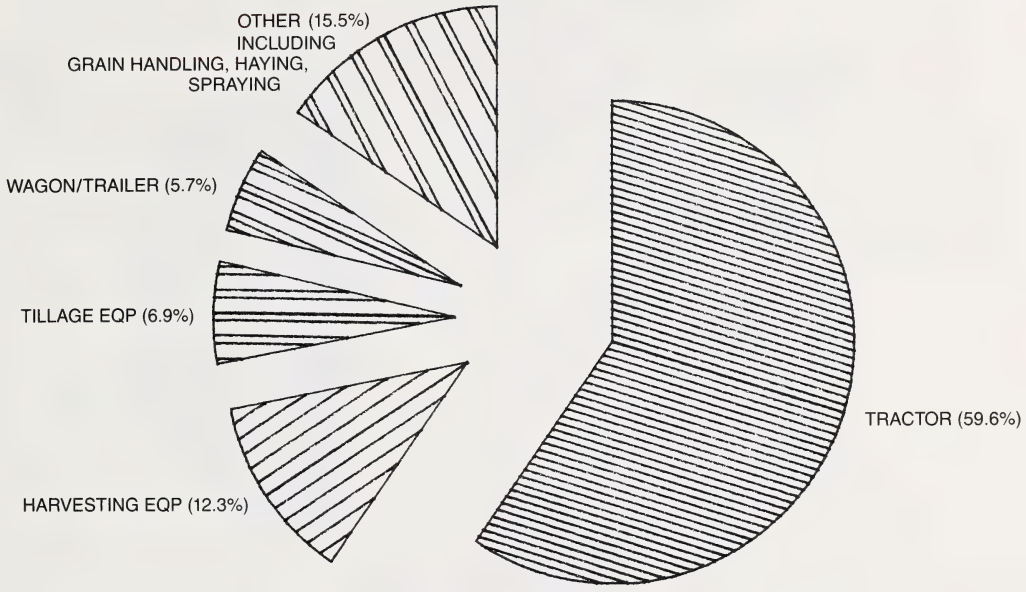


FIGURE 2.3 — TYPE OF EQUIPMENT

1982 – 1985



LIVESTOCK

FIGURE 3.1 — LOCATION OF ACCIDENT

JUNE 1976 – NOVEMBER 1985

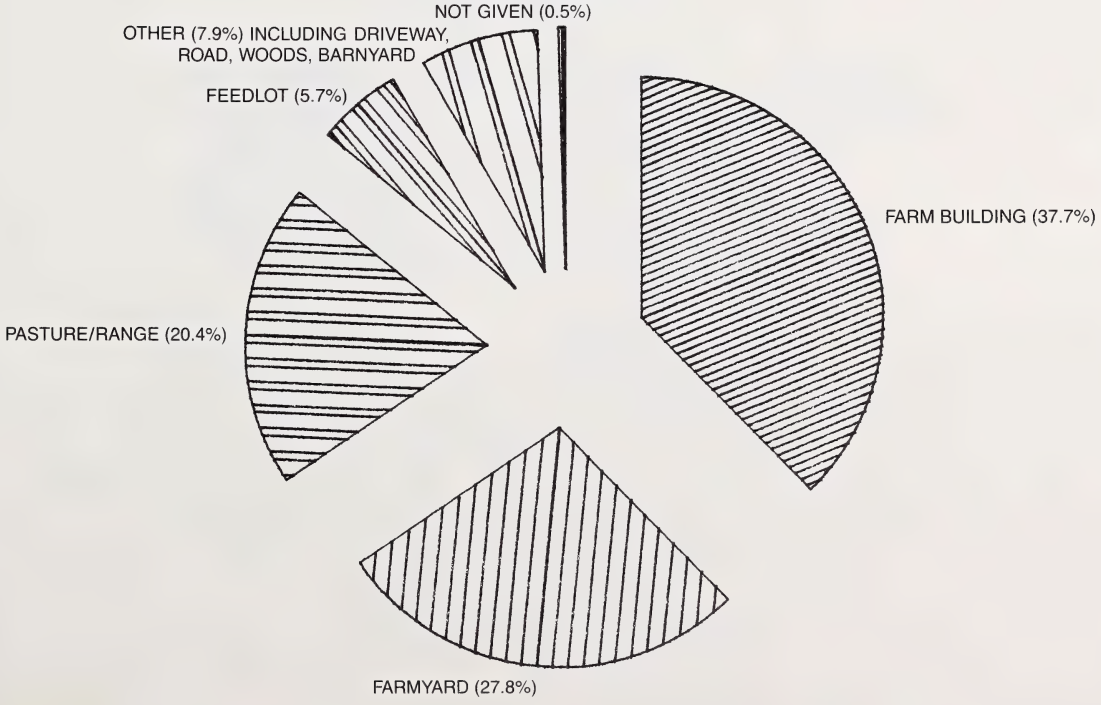


FIGURE 3.2 — ANIMAL INVOLVED

JUNE 1976 – NOVEMBER 1985

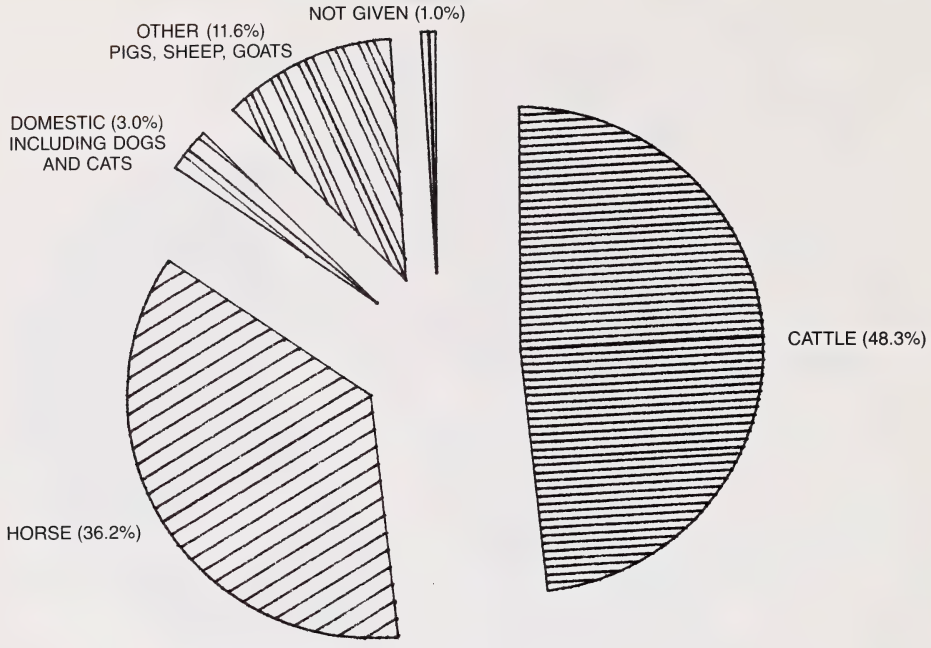


FIGURE 3.3 — ACTIVITY OF VICTIM

JUNE 1976 – NOVEMBER 1985

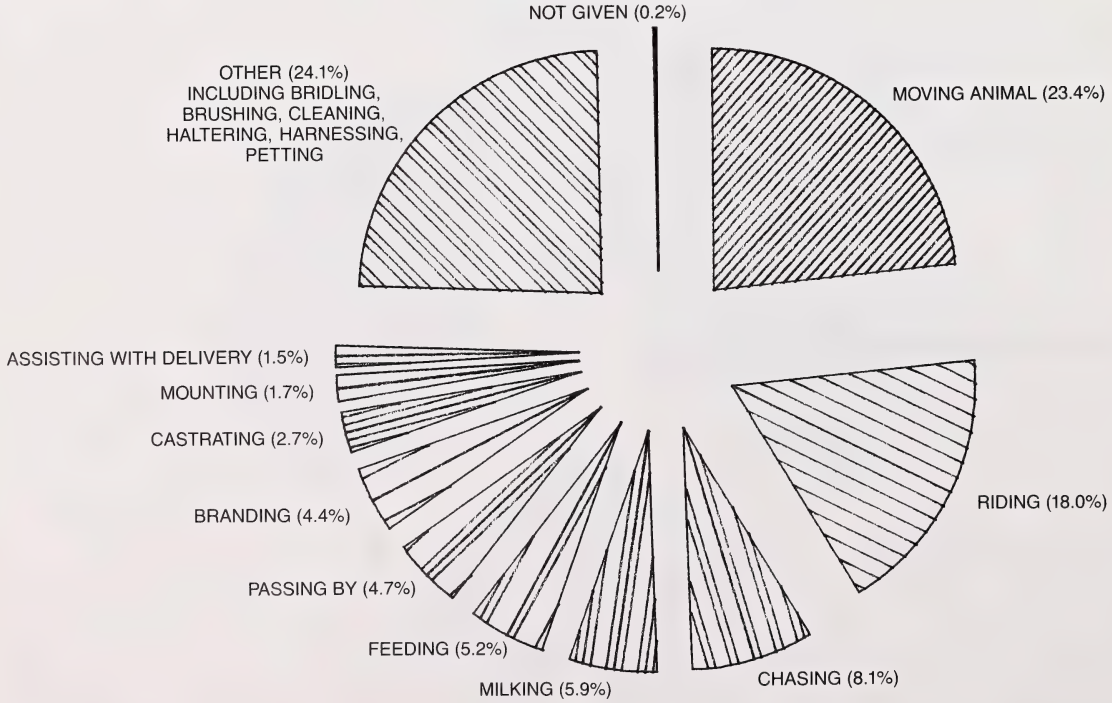


FIGURE 3.4 — ANIMAL'S ACTIVITY

JUNE 1976 – NOVEMBER 1985

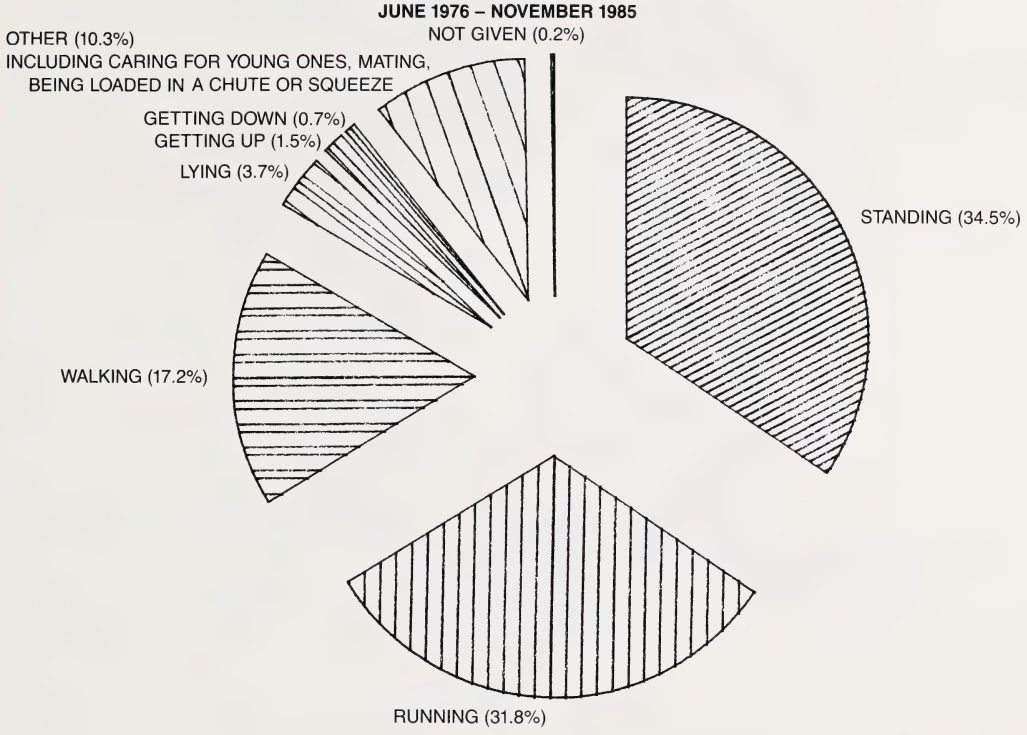


FIGURE 3.5 — HOW ACCIDENT OCCURRED

JUNE 1976 – NOVEMBER 1985

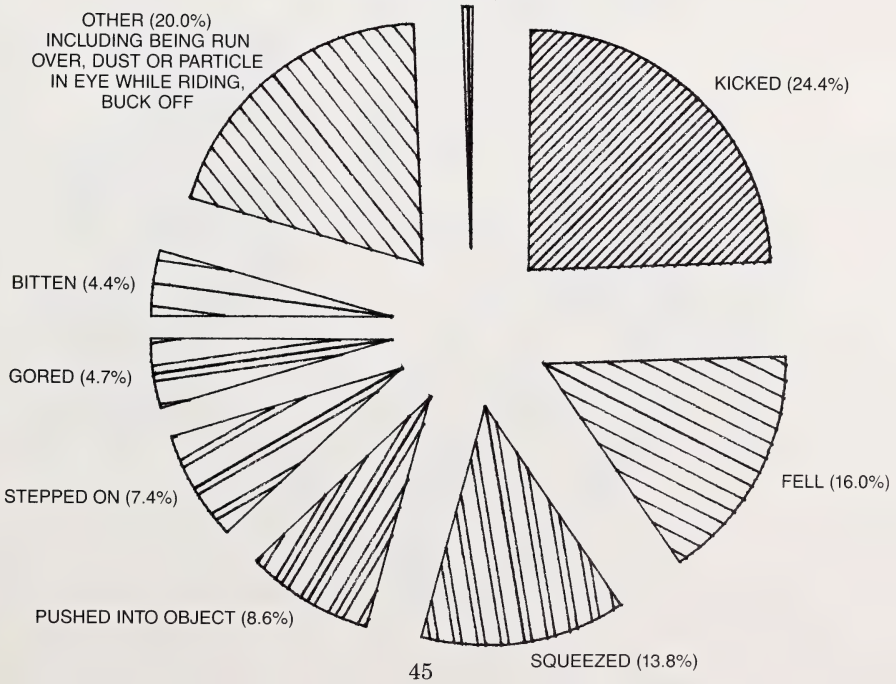


FIGURE 4.1 — ACTIVITY OF VICTIM

JUNE 1976 – NOVEMBER 1985

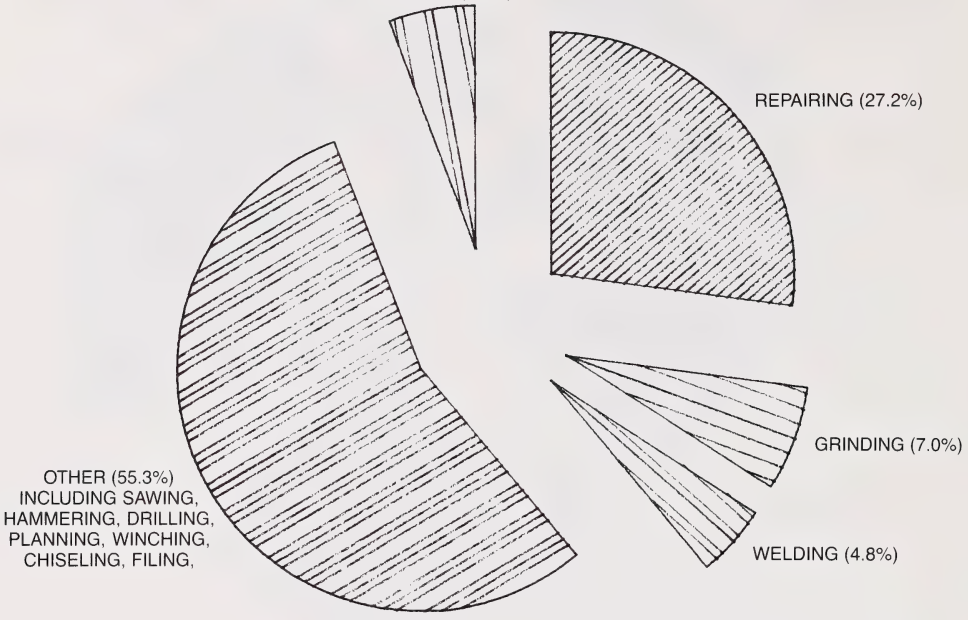


FIGURE 4.2 — PARTS OF BODY INJURED

JUNE 1976 – NOVEMBER 1985

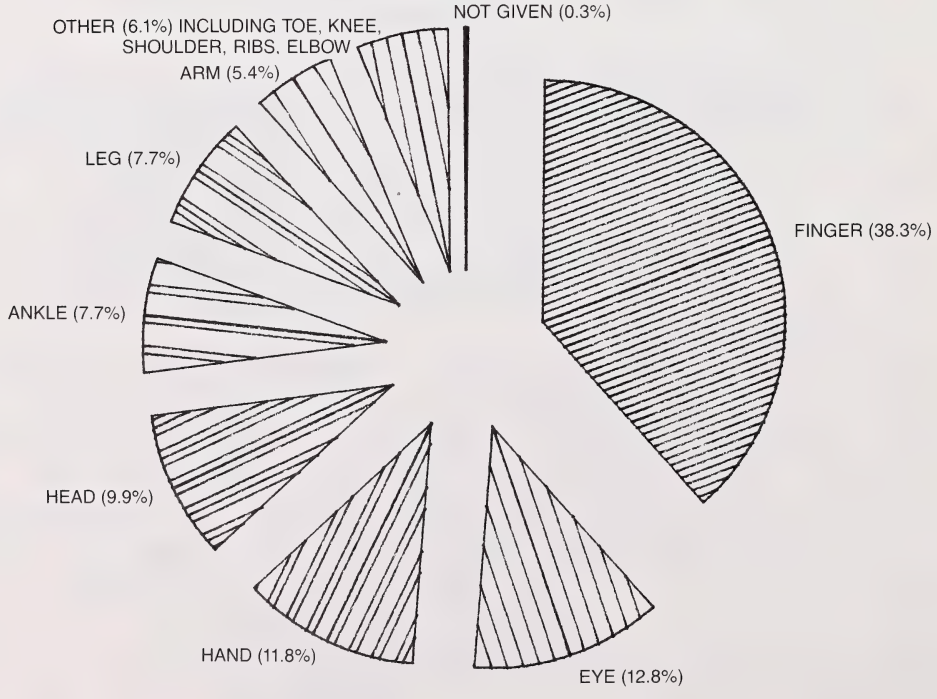
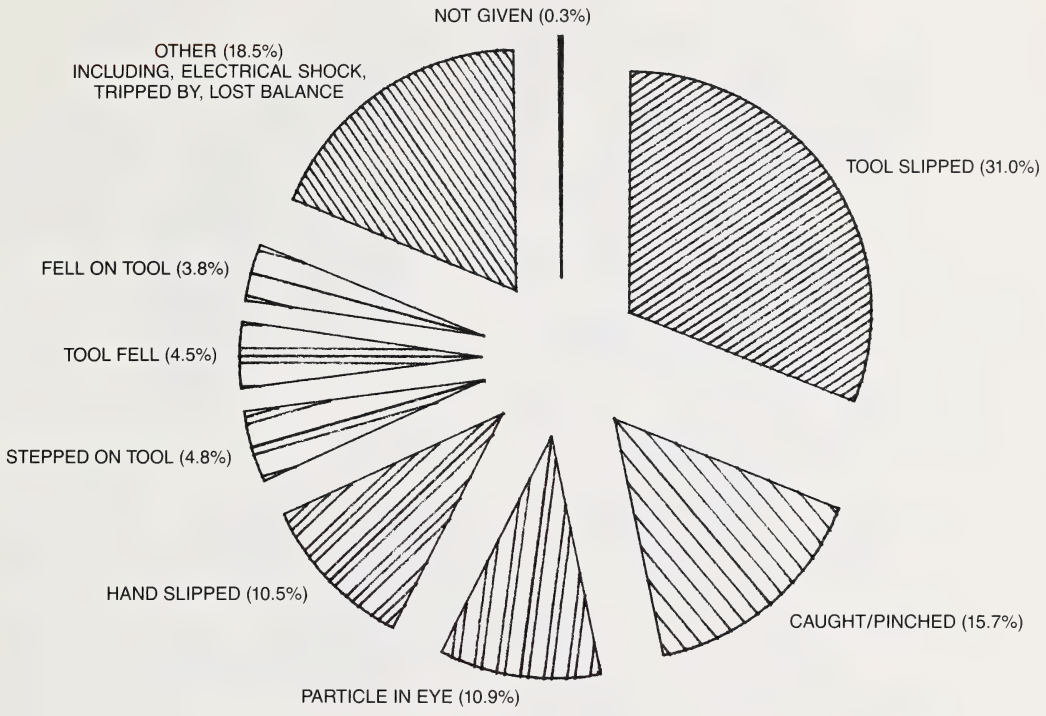


FIGURE 4.3 — HOW ACCIDENTS OCCURRED

JUNE 1976 – NOVEMBER 1985



CHEMICALS

FIGURE 5.1 — PART OF BODY INJURED

JUNE 1976 – NOVEMBER 1985

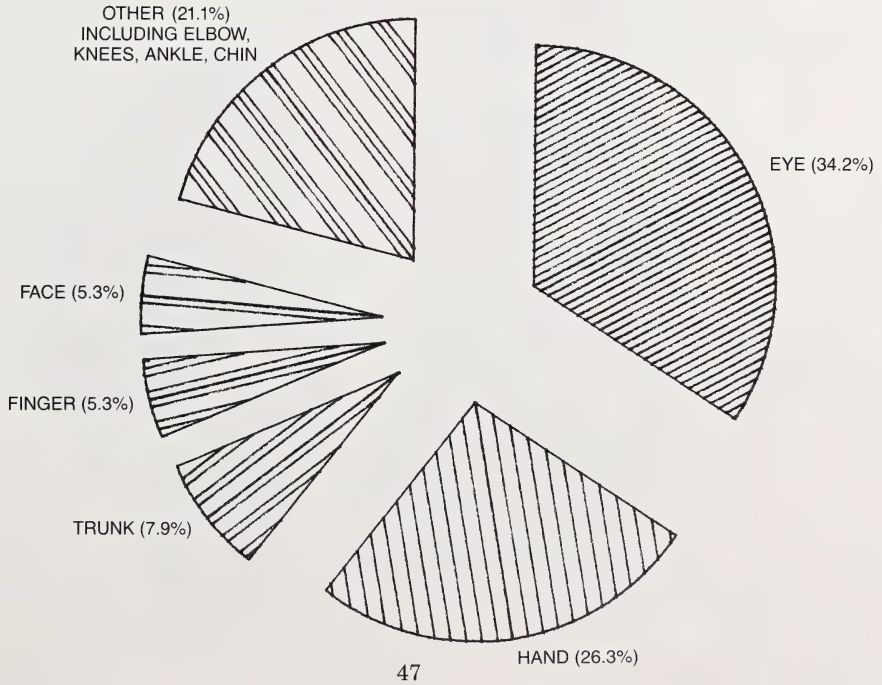


FIGURE 5.2 — ACTIVITY OF VICTIM

JUNE 1976 – NOVEMBER 1985

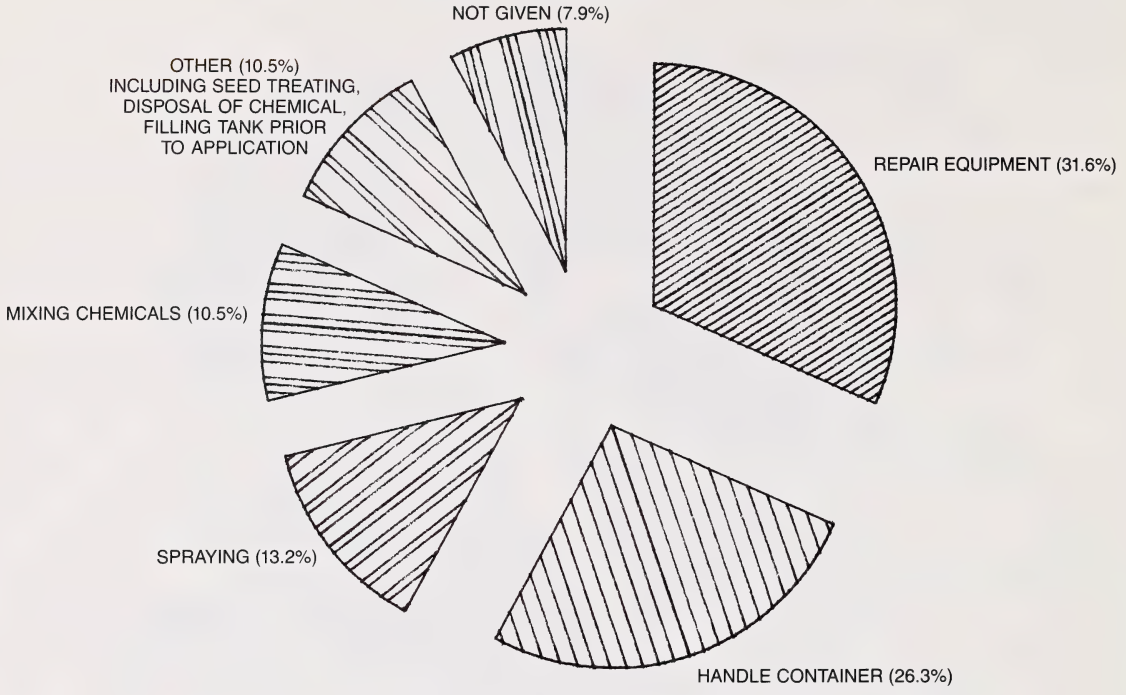


FIGURE 5.3 — PROTECTIVE GEAR

JUNE 1976 – NOVEMBER 1985

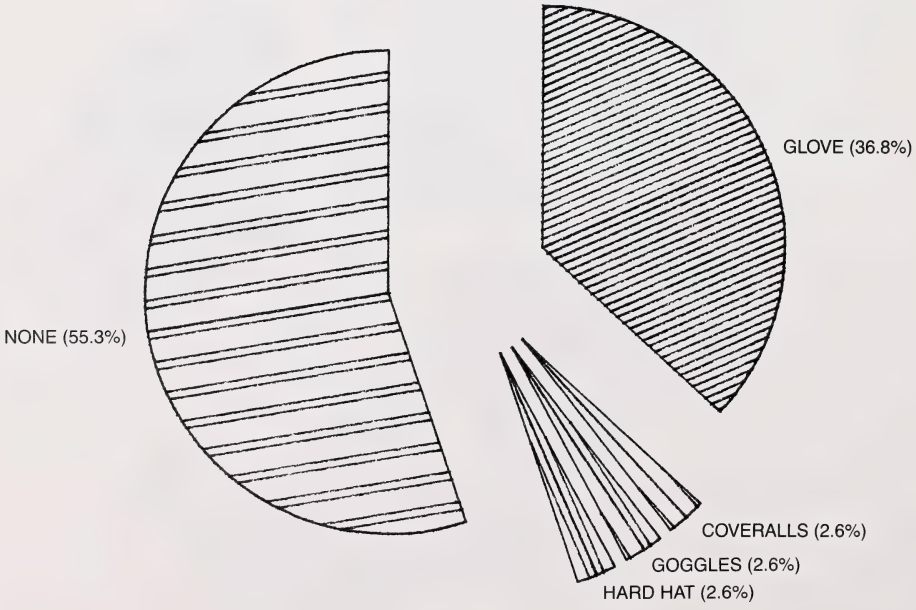


FIGURE 6.1 — DAY OF WEEK

1980 – 1985

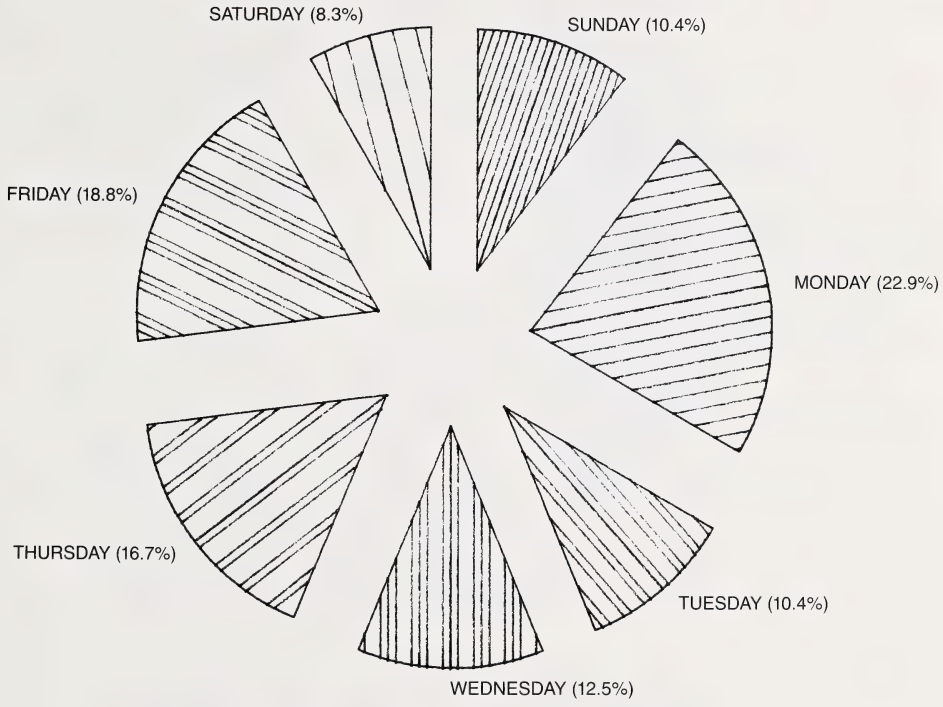


FIGURE 6.2 — MONTH OF YEAR

1980 – 1985

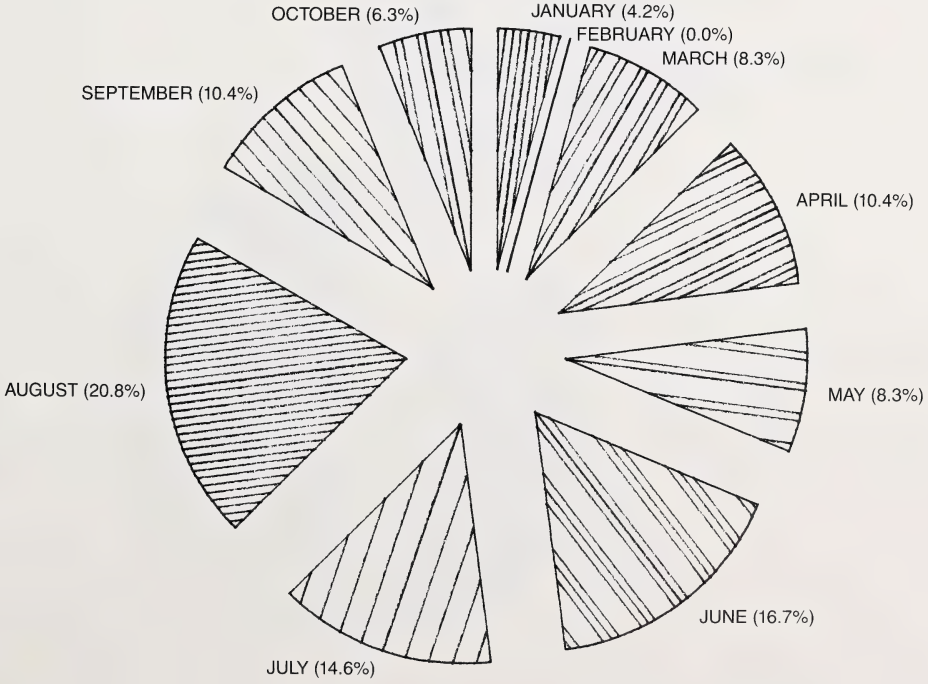


FIGURE 6.3 — ACTIVITY OF VICTIM (PERSONS)

1980 – 1985

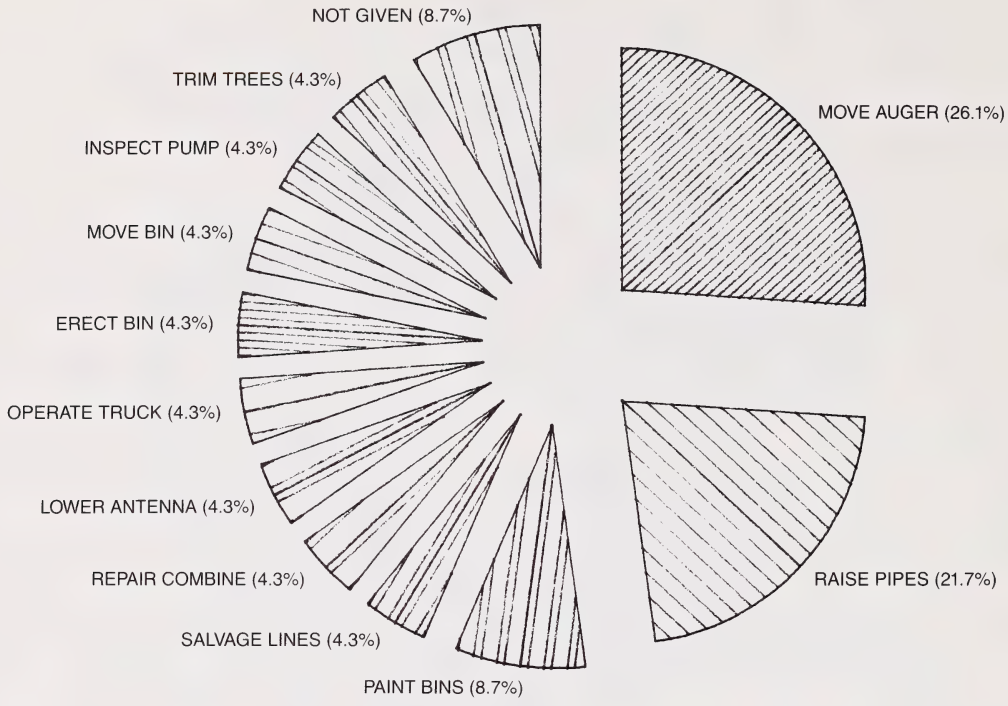


FIGURE 6.4 — SOURCE OF POWER (PERSONS)

1980 – 1985

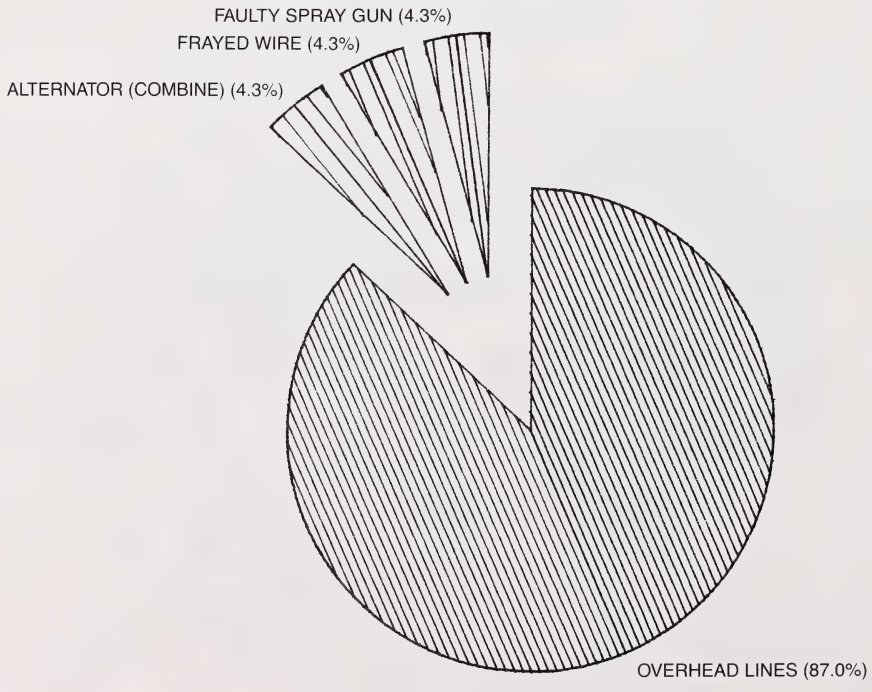


FIGURE 6.5 — SOURCE OF POWER (LIVESTOCK)

1980 – 1985

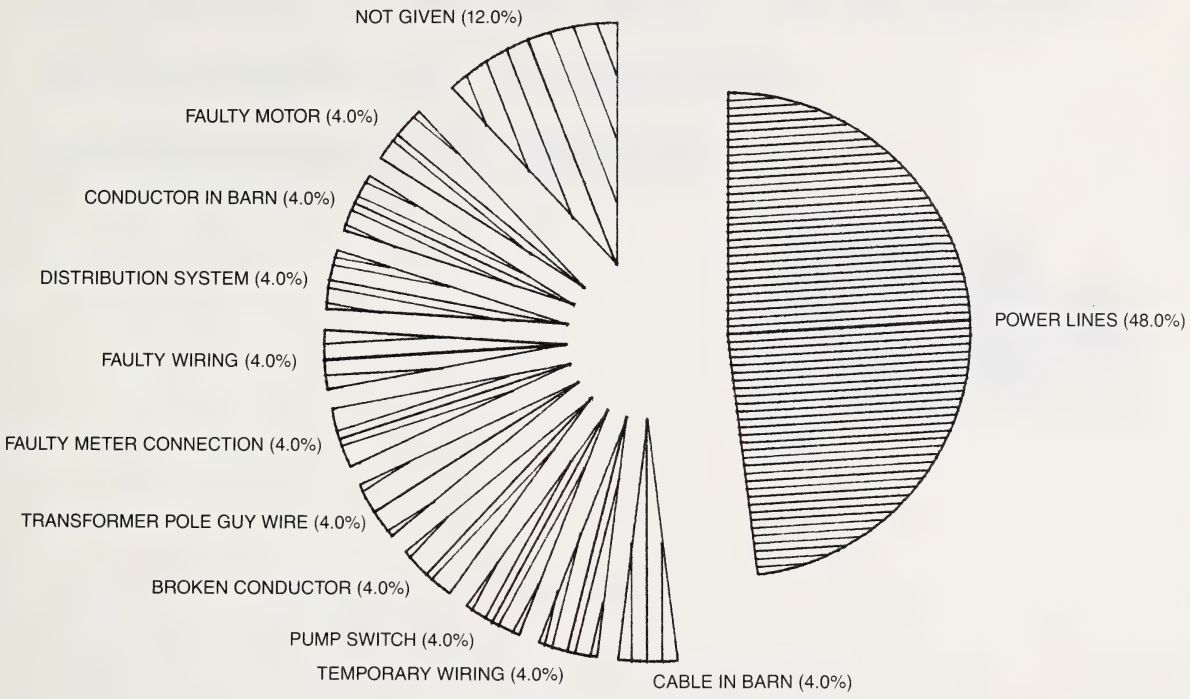
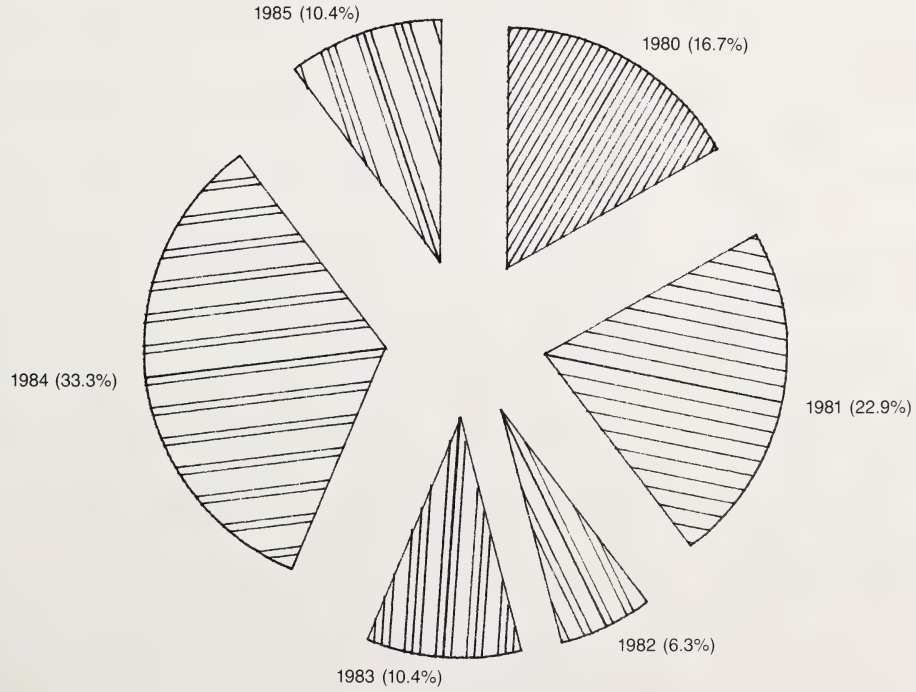


FIGURE 6.6 — NUMBER OF ACCIDENTS

1980 – 1985



Common Machine Hazards Related To Specific Farm Equipment

● – Present ★ – May be present, depending on model	Crush	Pulls In					
		Crush			Cuts		Wraps
	Jack, Hitch, Lifts	Chains Sprockets, V-belts, Pulleys	Gears, Rollers	Pick-ups	Auger	Blade Cutter Bar	PTO and Exposed Shafts
Tractor	●	★					●
Combine	●	●		★	●	●	●
Swather	●	●	●		★	●	●
Baler	●	●	●	●	★	●	●
Grain Auger	●	★			●		★
Elevator	●	●		★			★
Forage Harvesters	●	●		●	★		●
Wagons, Trailers	●						
Powered Forage and Bale Wagons	●	★		★			★

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Common Machine Hazards Related To Specific Farm Equipment

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